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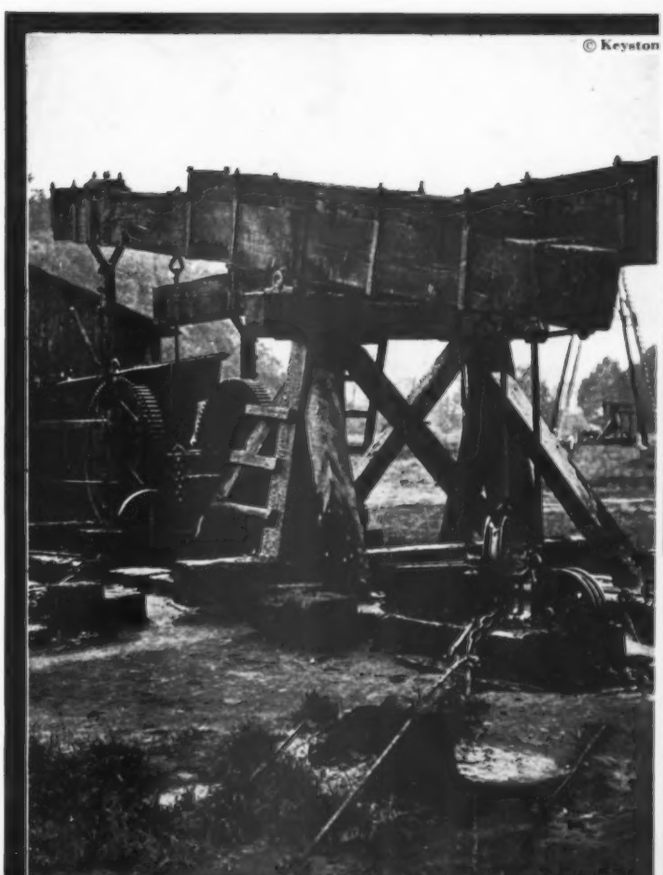

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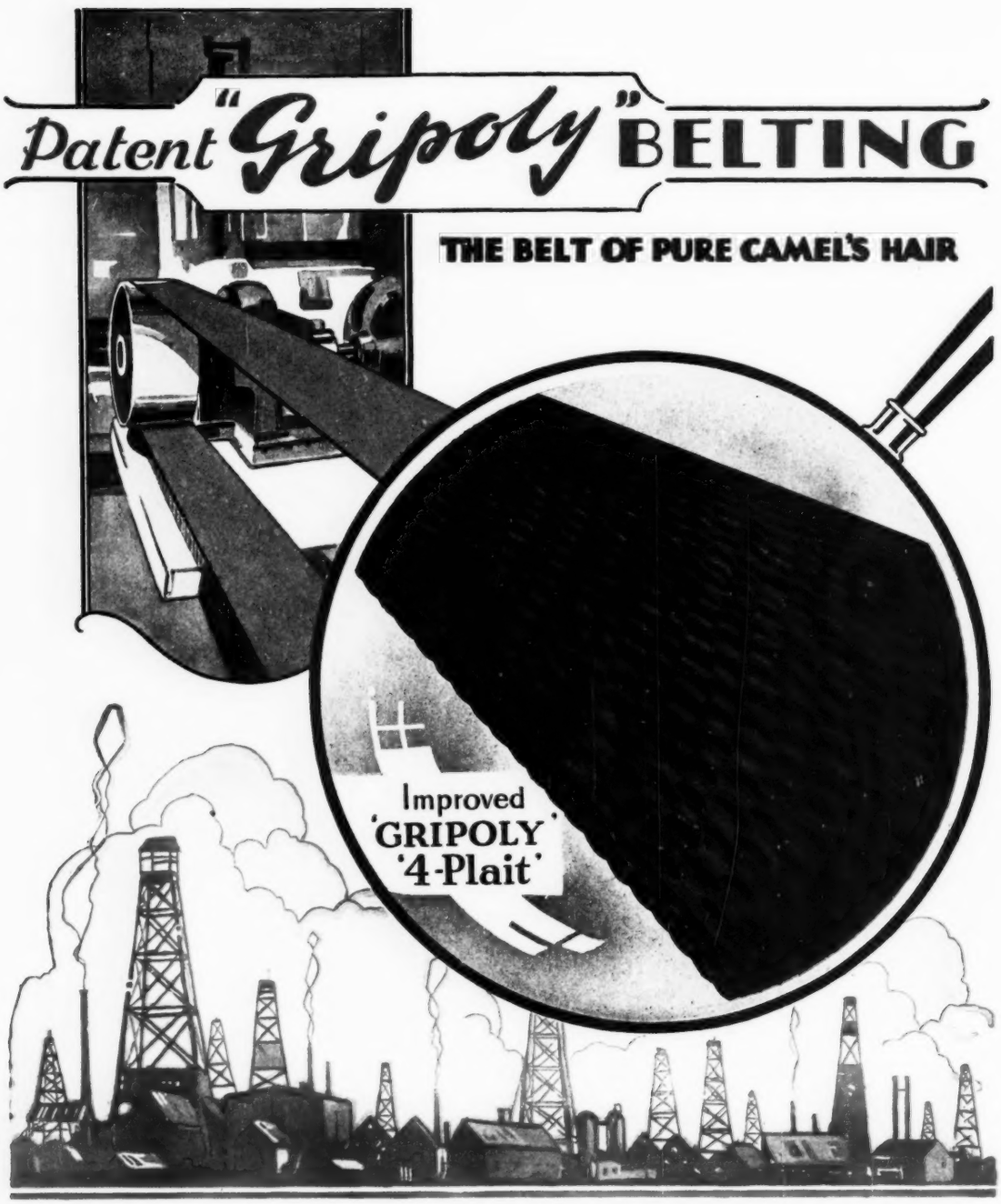

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WORLD PETROLEUM

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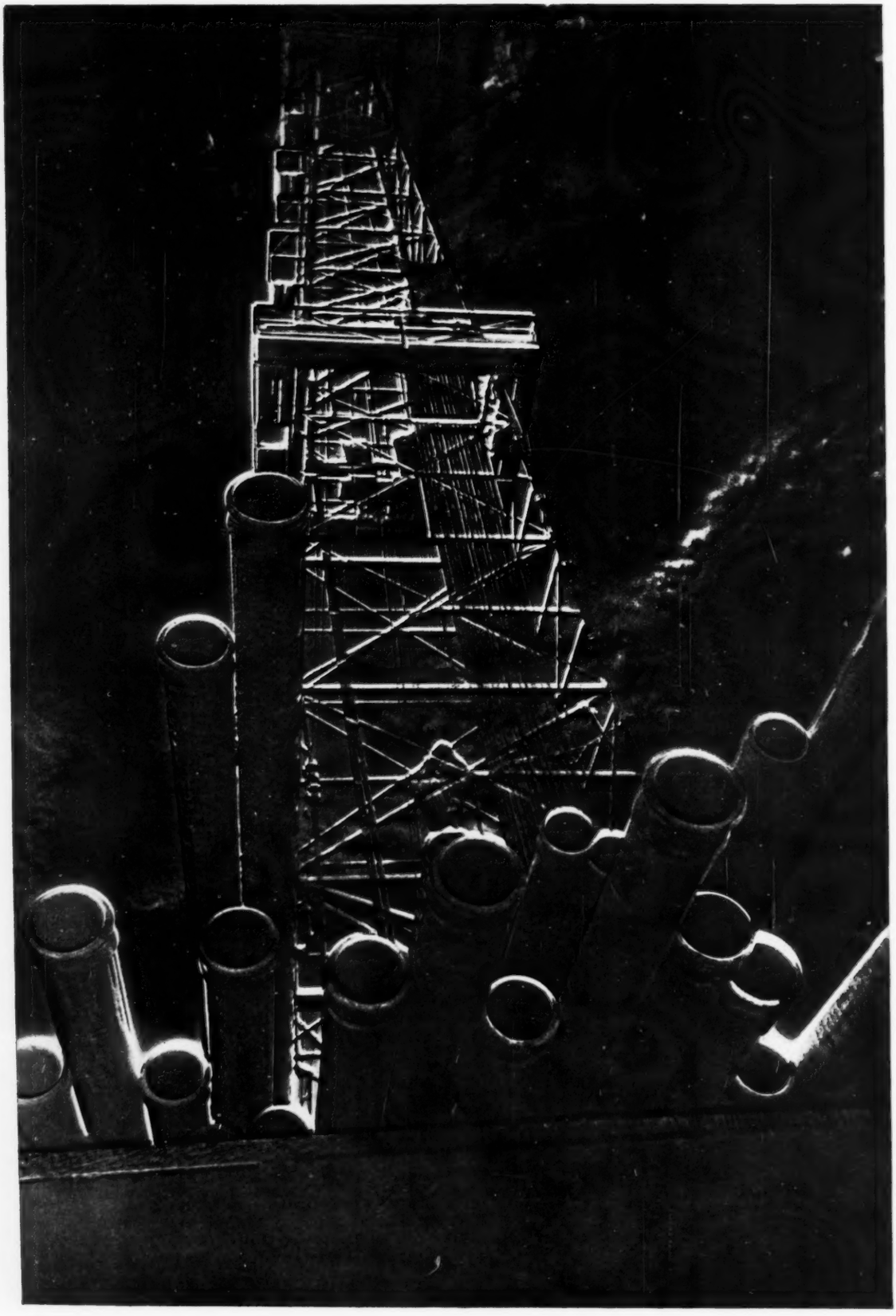

Bas-relief of the California oil industry? Unusual treatment of a photograph of Belridge 18 by Dick Whittington, published through the courtesy of the Union Oil Bulletin.

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PETROLEUM

BECAUSE the policies and activities of the Roosevelt administration have such a direct bearing upon international trade and finance and touch so immediately upon internal business operations of all kinds the November elections in the United States were watched with unusual interest both within and without the country. It was well understood that no serious impairment of existing party control was threatened. What was not so clearly anticipated was the very emphatic vote of confidence given to the President himself by the electorate in nearly all parts of the country where support of the national administration was made an issue.

American Elections

While varying interpretations have been given to the election returns the one most obvious conclusion to be drawn is that it greatly strengthens the President's hand in dealing with Congress or with discordant elements in his own party. No longer can he be accused of disregarding his party's platform. He has made his own platform and the majority of the voters have registered their approval of it. It will require political hardihood for Democratic Congressmen to oppose measures advocated by the President. Mr. Roosevelt himself, with the backing of a large majority in Congress, will feel less need than heretofore of bending his own judgment in order to retain the support of particular groups. He can afford to disregard the demands of those whose sole interest and activity is centered in extreme measures or in some special hobby or panacea.

As one keen European commentator has phrased it, the American political situation presents a closer consolidation of legislative with executive authority than ever before has existed. Dominance of the Chief Executive over Congress may not be in harmony with the plans of the fathers of the Republic but it is conducive to the carrying out of a consistent and decisive course of action.

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POSSESSION of great power, in the case of an elected chief of state at least, usually carries with it a great sense of responsibility. There is every reason to believe that this will be the case with President Roosevelt. In the time since he took office, which now is nearly two years, he has been engaged, as he himself has repeatedly stated, in a series of governmental experiments. While it would be unsafe to assume that the period of experimentation is ended the President's recent utterances indicate that he appreciates the need of revising some of the plans that have been under trial for the past year. He undoubtedly is in a far better position than he was in March, 1933 to appraise the needs of the situation and to formulate a program suited to the requirements for business recovery.

Situation Clarified

As a result of the election the business interests of the country undoubtedly are in a mood to cooperate with the administration in carrying out a constructive program and are willing to exert their own energies to this end. If the government, instead of trying to supplant private business, will direct its efforts to removing the conditions that menace confidence and stay initiative, industry will take up the burden of activity and carry it on. Recent outgivings from Washington indicate that such a policy is in contemplation. On the whole, therefore, the election may be held to have cleared the atmosphere and to have provided a situation from which a further advance toward normal business activity is possible.

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FOR THE oil industry, specifically, continuation of the Roosevelt regime for a probable six-year period will mean in all probability the maintenance of the policies already established, including a sustained effort to prevent excessive production. It is expected that a bill will be introduced in the next Congress giving the federal government more direct control in this field. In the past the President has not exerted his personal influence in pushing such legislation but if the control measures now being tried out in Texas are unsuccessful he may be inclined to do so. In respect to marketing the administration seems inclined to let the industry work out its own problems with the government prepared to take a hand if existing abuses are not remedied.

Bearing on Oil Industry

Efforts of the Washington authorities to encourage industrial recovery work to the benefit of the petroleum industry, employment of labor through governmental activities, benefit payments to farmers and the carrying out of the public works program all help to increase the consumption of motor fuel. Even the recipients of relief payments, in many cases, are able to keep the family car in operation. Extension of the administration's plans for the increase of employment along lines now under consideration will tend to maintain the growth in the demand for

gasoline which has been in evidence during the current year. Increased use of its products is, after all, one of the best possible remedies for the troubles of the industry. Such growth in trade volume seems fairly well assured.

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Federal Control Pro and Con

TWO NOTEWORTHY addresses before the annual meeting of the American Petroleum Institute were those of Oil Administrator Ickes and President Byles. The one presented the case for, the other that against federal regulation of the petroleum industry. Secretary Ickes directed attention to the price of crude and the improved earnings of producing companies. He mentioned the reduction of 14,000,000 barrels in crude stocks since the beginning of the Code period and the fact that gasoline in storage had been brought down close to the normal level of working stocks. He quoted statistics on increased employment and larger disbursements in wages.

President Byles's criticism of operations under the Code was broadly that too little attention was paid to fundamentals and too much to "well-intentioned but futile efforts to relieve each individual and collective ache and pain." He expressed opposition to legislation giving the national government authority over production on the ground that it would lead ultimately to control of the entire industry and all its operations.

On one subject both speakers were in agreement. They recognized the existence of unsound practices and serious abuses in the marketing branch of the industry. Both agreed that it was within the province of the oil companies to clear up these uneconomic conditions, but the Secretary of the Interior added a warning that unless the industry itself undertook the task of ending existing abuses the government sooner or later would be called upon to do the job.

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Marketing Conferences

HEARTENED by the better aspect of the crude market and the let-up in illegal production those who have labored for the past eighteen months to place other branches of the United States oil industry on a more orderly footing have been encouraged to renewed efforts. Cutting down of overproduction immediately revived the proposal for pool purchasing of distressed gasoline. In view of their past experiences in this connection, however, some of the major companies, while willing to support the plan, have felt it the part of wisdom to wait for convincing evidence that the suppression of illegal production in East Texas is more than a mere spasmodic occurrence such as has taken place at intervals heretofore.

In the meantime recurrence of gasoline price wars in various parts of the country has led to a series of conferences among marketing interests in the effort to reach a settled understanding on such troublesome questions as dealer discounts and the margin to be allowed to retailers of unbranded motor fuel. One of the suggestions put forward in these discussions is that all prices shall be posted so that sellers can fix rates at any level that may suit them so long as these are publicly announced. The purpose of preventing secret concessions is a laudable one but the difficulty of enforcing such a regulation remains an obstacle. Still, the desirability of avoiding the heavy losses arising from unsound marketing practices is so obvious that an agreement on these points should be possible and it is an encouraging symptom that some of the prominent executives are less disposed than formerly to insist upon their individual points of view.

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Poland's Policy

SOME months ago (June, 1934) WORLD PETROLEUM published an article dealing with the position of American oil companies operating in Poland in which the author suggested that the failure of these firms to comply with the broad implications of Polish government policy in regard to petroleum had placed them in a difficult position on the Polish market. Further investigation of the situation indicates that the difficult position of these firms is due to the impossibility of conformance with the government's policy for any extended period of time rather than to any unwillingness on their part to meet every practicable requirement. No matter how difficult may be the role of the companies as the result of the policy of the Polish government, the position of Poland itself will become even more difficult in regard to future supplies of oil if this policy is not soon revised. Should the government persist in its present short-sighted policy to the extent of making it impossible for the American firms, which are the backbone of the Polish industry, to continue operations, the development of peacetime national economy will be definitely retarded while the Polish situation in the event of war will be most unenviable. An enlightened policy of encouragement to the trustees of the national petroleum wealth certainly would serve the interests of the nation to better advantage than driving these companies to bankruptcy or withdrawal from the country. An article reproduced on other pages of this issue outlines the situation and presents facts that the Polish oil administration has too long overlooked.

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Sawdust as a Substitute

FOR COUNTRIES that have no native petroleum supplies and in which the cost of gasoline is extremely high the "gasogenes," described by Dr. O. W. Wilcox on other pages of this issue, may have interesting possibilities for the propulsion of certain kinds of vehicles. Trucks and tractors, especially those employed in agricultural work, conceivably might find space for the bulky fuel referred to, but it is difficult to imagine a motorist setting out for a pleasure tour with a cord of firewood or a dozen bags of sawdust for fueling his power plant. A very great saving in cost would be necessary to induce the owner of even the most modest motor car to transfer his patronage from the convenient roadside motor spirit pump to the neighborhood woodyard or saw-mill.

Forty years of progress in automotive engineering and the steady refinement of methods for processing petroleum fuel has led operators of motor vehicles to expect not only high efficiency in performance but simplicity of design and ease of operation. No substitute fuel yet discovered can meet these requirements so satisfactorily as high grade gasoline. Until some fuel is developed that can vie with the petroleum products in these particulars, owners of oil company securities need not rush to throw over their holdings.

Those whose recollections extend back to the early days of the motor age will remember the keen competition that prevailed between steam and gasoline for purposes of motive power. Steam driven vehicles had advantages in speed and in reliability but the fact that their operation required greater care and skill as well as certain mechanical drawbacks connected with them led to their gradual disappearance from the public highways. "Gasogenes" may have their good points but they still have far to go before displacing their gasoline driven competitors.

Japan's Policy Narrows Eastern Markets

Course Adopted in Manchukuo and Within the Empire May Lead to Gradual Forcing Out of Organizations Not Controlled by Its Own Nationals.

JAPANESE control and influence expand in a widening circle in the Far East. Since the beginning of the century the Empire has extended its authority over Formosa (Taiwan), the southern half of Sakhalin, Chosen (Korea) and sundry islands of the Pacific. Within the past year the newly created empire of Manchukuo has become a planet of the Rising Sun. No one familiar with Eastern affairs doubts that well formed plans exist for bringing other important sections of the Asiatic continent under its virtual if not nominal authority.

This situation is a matter of concern to the international oil trade. Wherever the authority of Japan extends the policy of bringing commercial and industrial activities into the hands of her own nationals prevails. In petroleum this tendency has been in evidence for a long time but it has taken more definite form within the past year, both in the enactment of new laws for the regulation of the oil trade and in other events of like significance.

Japan's leaders are fully alive to the importance of oil in the modern scheme of things. Being an island empire its chief arm of defence is its navy and oil is as essential as shells or engines to an efficient war fleet. Being an industrial nation oil is of first rate importance for use as fuel, particularly in the absence of high grade coal as an alternative. Japan, therefore, has given careful thought to providing ways and means of assuring adequate and dependable supplies of petroleum.

Widespread attention has been directed to Japan's policy and to its effect upon the international oil situation by publication of the fact that diplomatic protests had been lodged by the governments of Great Britain and the United States against the oil monopoly promulgated at Hsinking on November 14 for Manchukuo and the regulations recently established in Japan governing the operations of the oil trade. The present situation developed from a course of events that has been for some time a cause of concern to foreign oil corporations doing business in Manchukuo and Japan and diplomatic representations were made some months ago. It is now reported that the law establishing a monopoly in Manchukuo will become effective in a few weeks. It was the revelation of this contemplated action on the eve of the naval discussions in London that brought excited comment from press and public.

DIPLOMATIC maneuvering in connection with the Anglo-American-Japanese naval discussions in London within the past few weeks has brought the oil situation in the Far East into international prominence and has made the question of Japan's oil policy the subject of almost as much heated discussion as her demand for naval equality with the United States and Great Britain.

Both the petroleum regulations recently established in Japan and the projected oil monopoly in Manchukuo have been made the subject of representations as being discriminatory against British and American oil companies long established in eastern Asia and having large investments there, but whether these protests will have any effect in improving the position and outlook of foreign oil companies is doubtful.

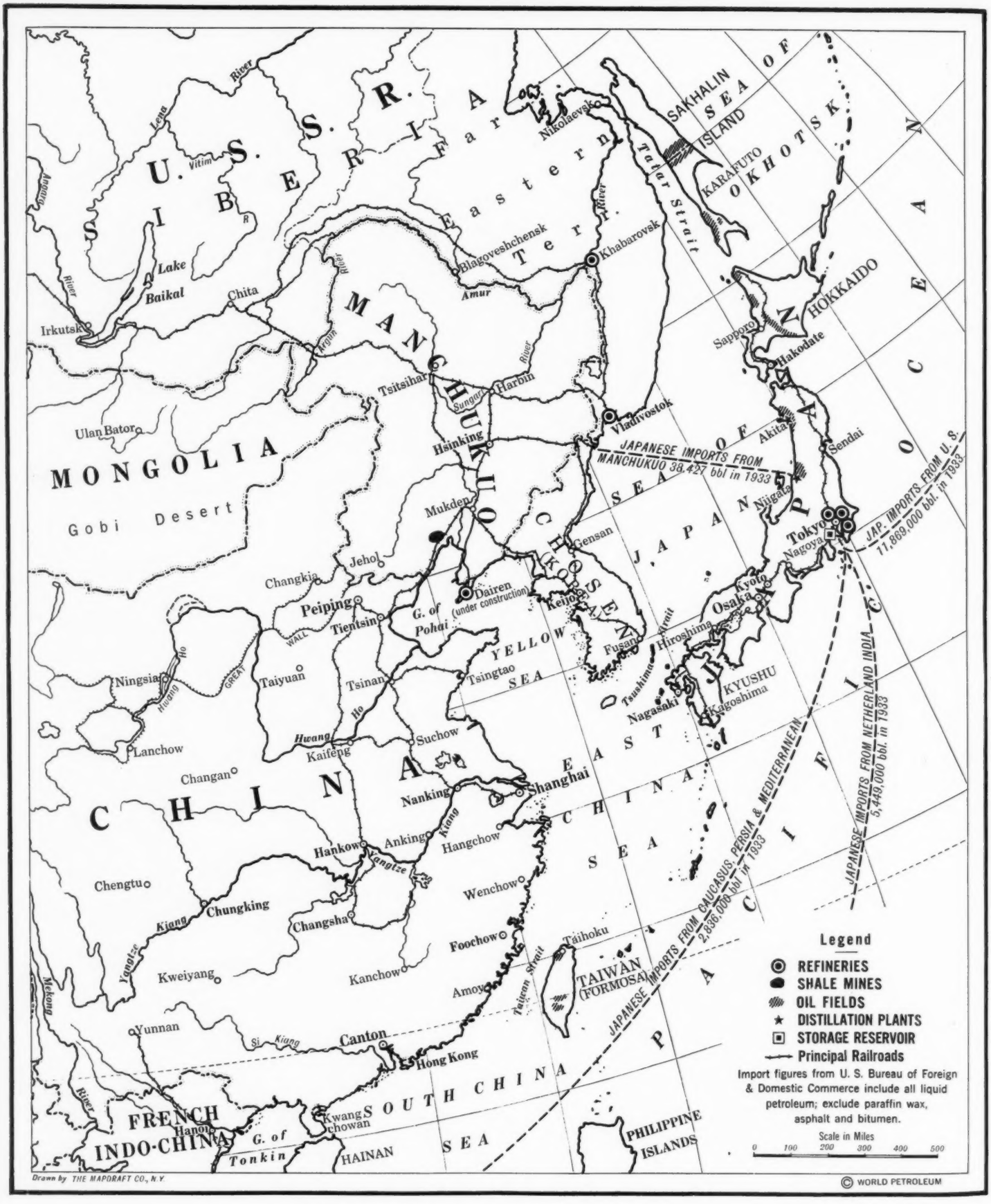
The following article deals with the situation in Manchukuo, with Japan's oil supplies and with the recently established oil laws.

From the commercial angle the situation in Manchukuo is simple enough but diplomatically it is rather complex. Several months ago a legislative proposal was brought forward in Manchukuo for the establishment of an oil monopoly. It was reported that the intention was to place the entire oil trade of the country in the hands of the Manchuria Oil Company with a capital of 5,000,000 local dollars which has been subscribed by the government of Manchukuo, the South Manchuria Railway, 80 percent of the stock of which is held by the Japanese government, and a group of Japanese oil interests in which the Nippon Oil Company and Ogura Oil Company figure prominently.

The Manchuria Oil Company is erecting a refinery at Kuchingtsu, opposite Dairen, which is expected to be ready for operation early in 1935. According to the reported plan the company was to produce petroleum products for use in Manchukuo and to become the sole distributor of such products. It was to take over the native employes of the foreign companies operating in Manchukuo and to acquire their depots and distributing facilities and proposed to continue purchasing crude oil from these companies.

Companies like the Standard Oil Company of New York (Standard-Vacuum) and the Royal Dutch Shell Group naturally did not relish giving up a trade position which they had developed through the course of many years and were loathe to relinquish facilities which represented a large investment. Whether because of opposition to the monopoly plan or because more time was needed to prepare for putting it in operation action on the monopoly measure has been delayed until the middle of November; but the construction of the Dairen refinery has gone steadily forward. Before establishment of the monopoly it was charged that the preferential treatment extended to petroleum products entering Manchukuo from Japan gave firms handling these products a great advantage in the local market.

The complication on the political side of the matter arose from the fact that Manchukuo, nominally at least, is an independent empire but it has not been recognized either by Great Britain or the United States, nor in fact by any nation



Map of the Far East showing significant locations of the Japanese, Manchurian, and Russian oil industry and imports of petroleum and products into Japan.

except Japan and Salvador. Japan's reply to official representations from British and American diplomats was that these should be made direct to the authorities of Manchukuo or, if recognition was withheld from that government, then to the government of China which had been its predecessor in control of the territory. In response to this attention was called to Japan's control of the Manchuria Oil Company and to the favoritism accorded to Japanese imports. Finally, in the middle of November Japan agreed to present the diplomatic representations from Great Britain, the United States and the Netherlands to the government of Manchukuo but pointed out that they could not interfere with the independent sovereign state of Manchukuo other than to forward officially the messages from the protesting governments.

Regardless of the immediate outcome of the diplomatic discussions the opinion of well informed oil men is that control of the refining and distributing trade of Manchukuo will gradually pass into the hands of native or Japanese firms and that other companies now operating in that area will have to be satisfied with supplying crude so long as this service is needed.

To understand the oil policy which Japan has applied within her own borders it is necessary to keep in mind the rapid expansion of her petroleum requirements which have multiplied five times in the past ten years and the great importance attached to oil in the scheme of national defence and preparedness.

As one effort toward meeting this need Japan has encouraged extensive exploration for petroleum deposits within her national area, supporting such exploration by government subsidy. These explorations have developed a productive belt extending through parts of southern Sakhalin, Hokkaido and Honshu. There is also a small oil-bearing area in the island of Taiwan, which perhaps is better known to the western world as Formosa. The combined output from these fields, however, is only about 2,000,000 to 2,500,000 bbl. yearly or about one-eighth to one-tenth of Japan's total requirements expressed in terms of crude.

The two principal producing fields are those of Niigata and Akita, both in Honshu. The former yielded 1,208,000 bbl. in 1930 and the latter 608,000 bbl. The two together therefore supplied more than 80 percent of the total output of 2,315,000 bbl. The Akita field is the one of more recent development and is noteworthy for having brought in a number of years ago the largest of Japan's wells with an initial flow of over 10,000 bbl. Both fields contain areas that have not been fully explored by drilling.

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Using modern machinery to construct modern highways in Manchukuo—eventually stimulating the consumption of petroleum products.

The output of these various fields, including those of Taiwan and Hokkaido, is handled largely by the Nippon Oil Company, Ltd. which operates six refineries with a combined daily crude capacity of about 13,000 bbl.

While drilling is being continued and is encouraged by a government subsidy the general opinion of geologists familiar with the country is that the likelihood of uncovering any large production is not particularly encouraging. Since 1926, out of some 40 wells put down in the islands where the larger part of the present output is obtained, fully three-quarters have been abandoned as dry holes or because of drilling difficulties encountered. In that period Japan's domestic production has grown from 1,700,000 bbl. to an estimated 2,500,000 bbl. The latter figure, however, is equal only to about one day's production in the United States. Nevertheless this small production is regarded in Japan as extremely important and no doubt the efforts to increase it will be kept up.

In questioning the development of a production materially greater than that which now exists the possible results from deeper drilling should not be overlooked. The wells that have been drilled vary from 1,000 to 3,000 ft. and it is by no means certain that larger production may not result from penetration to lower levels. For the present, however, and for some time to come Japan must rely on importations to supply the major part of her petroleum requirements. Imports of crude and heavy oils were reported as 11,313,000 bbl. in 1933 while imports of gasoline and kerosene are about 3,000,000 bbl. each.

As a substitute for domestic output, control of outside crude production would seem a logical move. In this direction Japan has not gone far, possibly because control of the world's most promising fields was preempted before Japan became active in this direction. Among the reasons advanced by outside commentators to explain Japan's ambition for ascendency over Manchuria was the acquisition of potential petroleum production. It is doubtful if this consideration can have had much weight, however, in view of the relatively poor outlook for the development of important oil fields in this territory aside from its extensive shale deposits.

In one outside productive field of some importance Japanese interests have succeeded in establishing themselves. This is in the northern half of the Island of Sakhalin which territorially is part of the Soviet Union and where annual production is something over 2,000,000 bbl. By skilful manoeuvering the American company that held the original concession in this district was deprived of it and exploratory and drilling rights in the semi-proven fields as well as in unexplored areas in the same general region were granted to Japanese interests. Strategists agree that in the event of hostilities between the two countries the Sakhalin field undoubtedly would be seized by Japan. In any event a considerable part of its output may be included among the available crude supplies of Japan and it is being used to feed the refineries in the northwestern part of the island of Honshu, supplementing the supply received from local fields.

In lieu of adequate domestic or controlled crude production the one practical means of guaranteeing adequate petro-

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The Hsinking-Kirin motor highway now under construction by the Manchoukuo State Highways Bureau.

leum supplies is to maintain large stocks in storage and since Japan's policy is governed primarily by the relation of oil to the national defence particular attention has been paid to the maintenance of large reserves. For the past few years the Japanese navy has been building up stocks and while exact figures of the volume of supplies in storage have not been published they probably amount to something between 16,000,000 and 20,000,000 bbl. or the equivalent of a full year's requirements both for industry and for the government.

In furtherance of this policy of preparedness in the matter of fuel supply Japan promulgated on July 1 a new law relating to the import and refining of oil. In effect it establishes a quota system for importers and refiners. The regulations, which apply to all parts of the Empire, require that permits must be obtained before oil can be imported or refined. The applicant for an import permit must state the kind and amount of oil to be brought in, where it is produced, the location and extent of his tankage facilities, whether shipments are to be in bulk or barrels, the port of entry through which shipments are to be made, the date when operations are to begin and the proposed plan of distribution.

After he has started business the importer must keep a daily record of receipts, shipments and reserves, must file a monthly report covering his operations and an annual report before the end of February in each year. He must also present before September 15 of each year an advance schedule showing the kinds and quantities that he intends to bring into the country.

Refiners who wish to obtain permits to begin or continue operations must have plants with an annual capacity of 50,000 kiloliters (314,440 bbl.) per year and must have sufficient tankage to maintain at all times a minimum reserve of 25,000 kiloliters (157,220 bbl.). In his application for a permit the refiner must state not only the location, operating capacity, and storage capacity of his refinery but also the sources from which crude supplies are to be obtained, whether they are to be delivered by regular tanker service or in some other manner, the refining process to be employed, the list of products to be manufactured and the plan adopted for the distribution of by-products. A set of blue prints showing the layout of the refinery and specifications as to its approximate cost must be filed. The application must state the names of the owners and if the owner be a corporation must be accompanied by a copy of its by-laws and a list of officers and stockholders. A copy of the annual financial report must be filed each year and the same daily, monthly and annual reports required of importers must be kept and filed.

Under the terms of the law the Minister of Commerce has the right to specify the location of tankage. He is authorized to inspect refineries, storage plants and records at any time and if these do not conform to the regulations the permit may be revoked. The Ministers of War and Navy reserve the right to purchase all stocks on hand at any time.

In the matter of reserves it is specifically provided that the quantity to be kept on hand during each six months period beginning April 1 and October 1 must be equal to one-half the amount imported or refined during the preceding six months. If an importer or refiner receives an order which will deplete his stocks below the specified requirement he must report that fact at once to the Minister of Commerce and must make up the shortage as soon as possible. Any changes in ownership or methods of operation must be reported and if an importer or refiner desires to suspend operations for a period of more than six months a permit for such action must be obtained.

The purpose of this measure is sufficiently plain from the terms of the law itself. It enables the government to know exactly the refining capacity and output at all times, to be advised fully of available stocks within the country and to be in a position to commandeer supplies should an emergency arise requiring such action. It is primarily a national defence measure but it also enables the government, through the Minister of Commerce, to exercise close jurisdiction over all branches of the oil industry at all times.

At present Japan has twelve refineries with a crude capacity of 21,120 bbl. daily. Five of these are small plants with a capacity of from 250 to 340 bbl. daily. As already mentioned six plants are operated by Nippon Oil Company Ltd. to deal with crude of domestic production. The largest plant in the country is that of Mitsubishi Oil Co. Ltd. It is located at Kawasaki City, has a daily capacity of 5,000 bbl. crude and is jointly owned by Mitsubishi and Associated Oil Company of California. It operates principally on California crude.

A large part of the business of distributing and marketing petroleum products is in the hands of Japanese companies. Among the international organizations which maintain distributing systems in Japan are the Royal Dutch-Shell, Standard-Vacuum, The Texas Company and the Soviet organization which, however, is represented by a combined Japanese-Soviet company.

Market conditions for the past several years have been such that these companies have been unable to operate profitably. Some of them have incurred heavy losses as the price of remaining in the Japanese market. They have done so,

probably, because of their large investments in bulk storage and distributing facilities. It is a safe guess that the proportionate share of these outside companies in the total volume of business will continue to decline unless they join forces with Japanese controlled organizations. In fact it has been rumored in trade circles that negotiations have been under way for some time between one of the largest of these companies and a prominent Japanese corporation looking to the transfer to the latter of part or full ownership of the oil company's long established business.

There has been talk from time to time of a government oil monopoly. In the light of recent developments, however, it seems unlikely that the Japanese government will set up a monopoly in the ordinary acceptation of that term, either by engaging directly in the business or by limiting importation, refining and distribution to a single company. Under the present law which provides for the maintenance of large stocks and enables the government to turn these to its own use at any time when such a course is deemed necessary the government enjoys all the advantages it would have under a direct monopoly without its obvious drawbacks. Steady pressure against outside companies will result in the gradual elimination of those who do not ally themselves with Japanese firms. From present indications another decade, or perhaps a still shorter time, will see Japan a closed market with its petroleum trade wholly in the hands of Japanese companies.

▼

A. P. I. Considers Results of Oil Code

Members Hear Ickes Detail Progress Made Under Oil Code While Byles Points Out Where Code Failed. Los Angeles Selected for 1935 Meeting. Byles Re-elected President of Institute.

THE American Petroleum Institute's Fifteenth Annual Meeting opened at the Adolphus and Baker Hotels in Dallas, Texas, on Monday, November 12 and closed Thursday night, November 15 after reviewing the political and economic developments affecting the petroleum industry in the United States, and summarizing outstanding technical advances in a series of papers that are reproduced in abbreviated form on other pages of this issue.

In addition to the features that make the annual meeting of the A.P.I. of very considerable interest each year to the petroleum industry, this year the meeting was looked forward to as a forum where opinions, as to the degree of success obtained by the government in attempting to regulate the oil industry, might be compared and the general attitude of the industry toward this form of government activity expressed. It was felt to be an opportunity to crystallize opinion on government policy toward the oil industry and permit the industry to determine its attitude toward the extension of this activity on the part of the government.

An excellent opportunity was afforded members of the Institute to make a decision on this matter when both the progress accomplished and the disadvantages encountered were set forth in two excellent speeches, the first phase of the subject being covered by Petroleum Administrator Harold L. Ickes and the second by the President of the Institute, Axtell J. Byles. In addition to a summary of the accomplishments of the oil code during the past year, Secretary Ickes outlined the future alternatives that confronted the industry, indicating that more orderly development and sale of petroleum reserves must be established by the industry itself or the government might be forced to make the United States oil industry a public utility, subject to a much greater degree of regulation than it had ever known hitherto.

Secretary Ickes began his speech by asking the members of the A.P.I. to consider the future of the oil industry in an objective manner, forgetting for the moment that they had personal interest in the industry other than as American citizens. Of the waste that had prevailed in the past, he said, he believed that the country as a whole was only vaguely aware; if they had known of it, Mr. Ickes believed, they would have put a stop to it. He felt sure that they would now put a stop to wasteful production if the industry did not forestall the necessity for such action. Mr. Ickes reminded the industry of the fact, of growing importance, that the petroleum resources of this country are limited, whatever the limit at which this figure is placed and that therefore it behooved the industry to exercise more care in the management of this wealth than it had in the past.

The Secretary said that from the beginning of his administration of the petroleum code, an instrument whose form he did not fully approve and which was drafted almost without consulting him, he had been besieged by two opposing groups of thought; the first school urged that minimum prices for oil and its products be established; the second urged control of production of crude to accomplish the same effect in a different and more practical way. The Secretary chose the second method and characterized the choice as a difficult one to make. He realized at the very beginning that the difficulty of this line of control would be administrative. Allocations were decided upon and no serious objection to the quantities as between various states arose. But enforcement of the allocations was a far more difficult matter with no adequate inspection force and insufficient means of prosecuting violators even when caught. Although the oil industry in the main cooperated most satisfactorily, a small minority made enforcement difficult.

In addition to illegal production and flouting federal regulations, this minority attempted to discredit the administration of the code and started a movement that claimed that the code was a failure and should be replaced by interstate compacts. The Secretary said that while he would not say that the code was a complete success, certainly it could not be called a flat failure.

The Secretary pointed to the increased earnings of the oil industry over the period of the oil administration, to the increased return to owners of oil royalties, to the improved position of labor, to the $1.00 a barrel price for crude maintained over the past year and to the improved statistical position of the industry. Crude stocks are 14,000,000 bbl. lower today than at the beginning of the code period; gasoline stocks have been reduced by 20,000,000 bbl. since last March and are now close to minimum working stocks that are necessary. Despite these improvements the Administrator realized that the plight of the non-integrated refiner who had to buy crude at the posted price and sell his product at the prevailing price for gasoline required immediate attention. It was for relief of this class that the gasoline quota plan and the gasoline purchasing pool plan had been undertaken. In both cases hot oil and resulting gasoline price wars had interfered with the completion of the plans. Oklahoma, and finally California had complied reasonably well with federal allocations but Texas, almost alone, had held out, refusing to cooperate with the federal government in attempting to rectify a situation for which that state was largely responsible.

Secretary Ickes made a strong appeal to the citizens of Texas themselves to put a stop to the waste of gas and the overproduction of hot oil which was depriving Texas of huge sums of money that might eventually be hers if the production of hot oil did not cut the price of crude, if gas was conserved instead of being blown into the air, and if efficiency replaced recklessly wasteful methods of production that left well over half the available crude in the ground. While Texas was suffering from the depression and accepting relief from the federal government, the Texas Panhandle field was blowing the equivalent of $60,000,000 worth of fuel into the air and Texas oil operators were attempting to cut the price of crude in half thereby decreasing the revenue of the state by 50 percent.

The Secretary reviewed the uneconomic form of marketing that resulted in overbuilding of outlets, price cutting, premiums, etc. and especially the practice of large companies in selling gasoline to competitors with the knowledge that it is to be resold at undercut prices. The code gives the Petroleum Administrator no power to control this practice.

Mr. Ickes referred to the promise that the industry could correct all the other ills that beset it if the running of hot oil was stopped, and said that in the establishment of the federal tender board he believed that the government had the instrument to stop the running of hot oil. The industry must now do its part in correcting marketing and production abuses if it was to avoid the heavy hand of government. He urged the industry to avoid the mistakes made by railroads and public utilities in the past and thereby avoid government management of the industry, which if once established would not be removed.

The other side of the picture of government interference in the oil industry had already been presented earlier in the meeting by Axtell J. Byles, president of the Institute. Mr. Byles suggested that faulty approach by the government was responsible for the ills that prevailed in the industry.

An already overbuilt industry, said Mr. Byles, was forced to spend additional sums for material and labor as a result of the code. Therefore an attempt has been made to erect an artificial level of prices for the industry's products, but these prices not being based on any sound economic foundation had not been supported. No attempt to approach the matter from the fundamental causes for the ills of the industry had been made, but innumerable efforts had been made to relieve each individual ache and pain. Thousands of orders and regulations had been in vain because they were not aimed at the fundamental causes of the chaos in which the industry found itself. Mr. Byles spoke of the overbuilding of the retail marketing end of the industry and the practice of loaning equipment. From here he traced the effect of these practices back through the refinery to the oil well itself. In this connection, Mr. Byles urged that rules prohibiting the loaning of marketing equipment and fixing the responsibility for the resale of a refiner's products at his price on the refiner himself would go a long way toward correcting the marketing situation.

Dealer margins were increased in the struggle for gallonage and this trend was accentuated by the code principle of giving a greater return to labor. This, however, was not always the purpose for which these margins were used and it was now clearly necessary to return to a sound basis of dealer margins. Dealers' margins should vary with the price of the product thereby giving the dealer an interest in supporting prices instead of an interest in cutting prices to obtain more gallonage.

For marketing, Mr. Byles suggested four rules:

(1) Requiring posting retail and tank car prices;

(2) Forbidding loaning of equipment;

(3) Forbidding procurement of violation of competitors contracts;

(4) Making refiner, distributor, wholesaler and jobber responsible for the resale of his product at his posted market price.

In speaking of crude production control, Mr. Byles pointed out that government control of crude production would give rise to the necessity of allocating this production among the hundreds of refineries and hence of eventual control of the refining branch of the industry and through this control to complete control of the marketing branch which would mean finally complete socialization of the petroleum industry. Private management would be at an end and a period of inefficient high-cost management of the oil industry would result.

To avoid this condition it is necessary for the control of crude production to be passed back to the states where it has the sanction of law. Control for the whole country can be accomplished through interstate compacts and the federal government can aid by continuing to prohibit interstate shipments arising out of violations of state laws.

Mr. Byles pointed out that petroleum history showed clearly that the industry could not be prosperous when low crude oil prices prevailed, and that crude oil prices were governed by product prices. Under the code product prices did not justify the crude oil price of $1.00 per barrel which was artificially maintained. Lately conditions have become steadily worse as a result of the oversight of the importance of flexible crude prices. The gasoline purchasing plan to eliminate distress cargoes was simply a means of tying down the safety valve thereby making the explosion worse when it occurred. A ten cent cut in crude prices applied in time would be far more effective and less expensive than a 50 cent cut too late. Crude prices should be flexible. Mr. Byles ascribed the improvement in the statistical position of the industry to increasing consumption and failure to discover new large pools and mentioned that orderly development of present pools helped considerably.

Mr. Byles summed up his speech by saying:

". . . Public interest in this as in any other industry is best served . . . by private ownership management and operation . . . that in the long run in this as in every other business operated under the private or competitive system, the individual or group of individuals who can furnish to the public the best products at the lowest cost will longest survive and derive the greatest profits . . ."

Baird H. Markham, director, American Petroleum Industries Committee, spoke on the problem that taxation presented to the industry. The question of whether the government through taxes or the industry through trade would get the

consumer's dollar was of growing importance. The industry's net earning in 1933 amounted to about one fifth of the total tax bill of $1,004,824,028. Total taxes on a barrel of crude oil and its derivatives now amounts to $1.11 compared with the Petroleum Administrative Board's recent report that the cost of production per barrel was 80.6 cents and the market price 72 cents. General Markam concluded with a plea that the industry and the consumer unite in an effort to obtain relief from these entirely disproportionate taxes.

The directors reelected Axtell J. Byles president of the Institute for the next year and selected Los Angeles as the location for the 1935 annual meeting. This selection was in accordance with a movement initiated several months ago by PETROLEUM WORLD of Los Angeles when that oil journal urged that the A.P.I. be invited to Los Angeles for their next meeting. The Mid-year meeting will be held at Tulsa, Oklahoma.

W. R. Boyd, Jr., of New York, was reelected executive vice-president, and C. E. Arnott, of the Socony Vacuum Corporation, New York, was reelected vice-president for marketing. K. R. Kingsbury, of the Standard Oil Company of California, San Francisco, was reelected vice-president at large.

New officers were: George A. Hill, of the Houston Oil Company, Houston, vice-president for production. He was elected to succeed Charles F. Roeser, of Fort Worth.

W. G. Skelly, of the Skelly Oil Company, Tulsa, Okla., was elected vice-president for refining, to succeed Howard Bennette, of Tulsa.

Frank Phillips of the Phillips Petroleum Company, Bartlesville, Okla., was elected treasurer, to succeed H. L. Pratt, of New York.

Lacey Walker, New York, was reelected secretary and assistant treasurer.

The executive committee is composed of the newly-elected officers and the following: C. B. Ames, of New York, with the Texas Company; W. B. Teagle, of New York, Standard Oil Company of New Jersey; H. F. Sinclair, of New York, the Consolidated Oil Corporation; E. G. Seubert, of Chicago, Standard Oil Company of Indiana; J. C. Van Eck, of New York, Shell Union Oil Corporation; F. A. Leovy, of Pittsburgh, Gulf Oil Corporation of Pennsylvania, and J. Howard Pew, of Philadelphia, Sun Oil Company.

The membership of the board of directors of the institute was increased to eighty-nine, and eight new members were selected. Others were reelected.

Four new directorships-at-large were authorized. Men elected to the new positions were George A. Hill, Houston Oil Company, Houston; John M. Lovejoy, Seaboard Oil Company, New York; R. L. Wheelock, Corsicana, Tex., and W. S. Farish, Standard Oil Company, New Jersey.

Others elected were:

Pacific Coast Manufacturing Group—C. E. Olmstead, the Texas Company, New York.

Eastern United States Manufacturing Group—W. B. Hartman, Gulf Refining Company, Pittsburgh.

Supply Group—A. A. Moody, Jarecki Manufacturing Company, St. Louis, and J. A. Crawford, Republic Supply Company, Los Angeles.

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Year's Technical Developments Reviewed at A.P.I.

Viscosity Standards

THE WORK of the A.P.I. Committee on Viscosity Standards, as reported by T. G. Delbridge of the Atlantic Refining Co. (chairman) has at last reached a fairly satisfactory conclusion after nearly 12 years of painstaking labor. The chief difficulty, aside from the preparation of master tubes of stainless steel for Saybolt Standard and Furol viscosimeters, has been to establish standard conditions of operation and then to write directions so clearly that all ambiguity will be eliminated. The standard A.S.T.M. method has now been reduced to unmistakable language, and with viscosimeter tubes standardized against the master tubes it is possible for careful operators to obtain results that fall within the official tolerance of plus or minus one percent.

Diesel Lubrication

THE LUBRICATION of solid injection Diesel engines, as understood by W. G. G. Gordon of the Socony-Vacuum Co., involves a considerable variety of factors, among which pressure and temperature in the power cylinder are among the most important. Besides resistance to heat, a satisfactory lubricant for the cylinders of Diesel engines should distribute readily, have a low fluid friction and be heavy enough to resist ring pressure; in a word, a Diesel lubricating oil should have film strength at high temperature. The development and rapid distribution of automotive (high-speed) Diesels have enormously stressed the need for satisfactory lubrication for these high speed engines, which operate with a high crank-case temperature. In addition to the characteristics of power cylinder oils, oils for Diesel lubrication should have high chemical stability, ability to separate readily from solid impurities and water, and correct body and fluidity. This requires both skillful selection of petroleum crudes and scientific planning and execution of refining operations.

Maintaining Quality of Fuller's Earth

FILTER house operation in refineries is an ancient art, but, according to Ashley L. Shepard of Sutton, Steele and Steele, it is still affected by problems that have defied clear-cut solution. Among these is the question as to when a used fuller's earth should be discarded. If a new clay has a decolorizing value of 58 points, on the 10th burning this value will fall to 18½ points. The reason is that with each burning there is incipient fusion of a part of the material, so that the earth gradually loses its absorbing power. The problem of maintaining the earth is therefore to get rid of the inert material. This is possible because the partly fused particles have a higher specific gravity and can be segregated by a dry-concentration table built by the author's firm which operates on the air flotation principle. By subjecting regenerated fuller's earth to this process a No. 10 burned earth still shows a decolorizing ability of 44.

Diesels for Heavy-Duty Transport

"WHAT OF the market for the high-speed automotive Diesel engine?" asks Joseph Geschelm, editor of AUTOMOTIVE INDUSTRIES. The answer is that a considerable proportion of the 161,000 trucks of 2½ tons and up that are now registered are Diesel powered, and production is now at the rate of 20,000 a year. Acceptance of the Diesel is based almost entirely on fuel economy, which under present conditions is of the order of 60 to 80 percent of the gasoline bill. Ultimately, if and when the price of fuel oil approaches the price of gasoline, the Diesel must rest on its inherent economy, which is of the order of 30 to 50 percent saving in fuel cost. The entire development appears to rest on the availability of acceptable Diesel fuel, price, and taxation. The author recommends immediate action on the development of fuel specifications, control of price, study of the tax problem, and closer cooperation between the petroleum industry and the builders of Diesel engines.

Characteristics of Diesel Fuels

UNTIL recently, say C. C. Moore, Jr., and G. R. Kaye of the Union Oil Co. of California, ignition lag at high speeds has become a factor of paramount importance in Diesel engine operation, and a place must be made for a test of this quality. A machine for determining the "delay number" has been constructed by the research department of the authors' company. The ignition delay of various Diesel fuels has been correlated with the cetene number (percent of cetene in a blend of cetene and alpha methyl naphthalene), and also with the viscosity-gravity constant as determined by a modification of the method of Hall and Coats. It is thus possible to relate cetene number and viscosity-gravity constant, with the result that a very accurate estimation of the ignition characteristics of a Diesel fuel may be obtained simply from a routine determination of viscosity and gravity, and the use of a table prepared by the authors.

Rail-Car Fuel Possibilities

THE RECENTLY introduced streamlined, light-weight, high-speed motor train has raised the question of suitable fuel for this service. According to D. P. Barnard of the Standard Oil Co. of Indiana, neither gasoline, distillate, nor Diesel equipment is the complete answer. Although under certain circumstances the butane engine would result in a fuel cost about 20 percent higher than the Diesel engine it has appeared that the difference between butane and a satisfactory Diesel fuel will be rather small, in which case the butane engine appears to have certain definite advantages that will be decisive. The matter is not closed, as there is yet not much of a background of experience.

Extreme Pressure Lubricants

THE COMMERCIAL situation of automotive EP (extreme pressure) lubricants, as reviewed by H. C. Mougey of the General Motors Corp., is that these lubricants are becoming of much greater importance, and that developments of great advantage to both the automotive and oil industries are in prospect. An obstruction that remains to be cleared away is that machines used for comparing EP lubricants differ in design so that different machines give different ratings to the same oil. This is a matter for further cooperative development. Both the powerful and the mild types of EP lubricants are in definite commercial demand.

Pressure Distribution

THE EFFECT of different production rates on pressure distribution in East Texas is the subject of a paper by C. E. Reistle, Jr., Field Chairman of the East Texas Engineering Association. The most important conclusion to be drawn from a study of the reservoir pressure changes across this field is that the pressure differential will increase as the rate of production is increased, and this results in a very rapid loss of pressure on the east side of the field until the new pressure gradient is established. At lower rates of production the flowing life of the field will be longer than is indicated by the difference in the decline of the average pressure of the field. Each time the allowable production is changed, and with new allocation of production to individual wells, notable changes occur in the differential pressure.

Probabilities and Wildcats

EXECUTIVES in the land, geological and production departments of oil companies constantly have to reach decisions as to commitments in wildcat acreage. The conclusions depend on a number of things, among them the cost of operation, expected profit, capital required, and the probability of a successful result. It is this matter of probability of success that engages the attention of J. T. Hayward of the Barnsdall Oil Co. If concrete numerical values can be assigned to the elements of a wildcatting proposition, these numbers can be used in some simple equations that will facilitate the decisions to be made and place them on an arithmetical basis. The author shows the derivation of these equations and their manipulation, and he gives hints on the classification of wildcat data. However, he does not suggest that any manipulation of formulas can replace expert knowledge.

Dealer Margins

THE CHAIRMAN of the Texas Planning and Coordinating Committee, Fred M. Lege of the Magnolia Petroleum Co., has reached the conclusion that the present high cost of marketing has been brought about by several unsound methods of sale and distribution. Of these perhaps the most important is the dealer margin. The core of his observations on this matter is that the dealer's compensation should be dependent on the price at which the gasoline is sold; he would therefore have a powerful incentive to keep the price up and would be disinclined to supply gasoline to the price cutters.

Road Detonation Tests, 1934

THE COMMITTEE on Cooperative Fuel Research, through C. B. Veal of the Society of Automotive Engineers, secretary, presents a report on a second series of road tests on gasolines and cars. Broadly speaking, the object of these tests has been to check the validity of the correlation between road knock ratings and laboratory knock ratings, and to discover promising lines of research toward better mutual adaptation of fuels and engines. In test runs of approximately 50,000 road miles with 19 cars of 13 different makes and utilizing the services of 40 experts for a month each, these cars were tested on the same reference fuels and a number of brands of gasoline were tested on the same cars. The result is a vast body of data revealing the characteristics of fuels and of cars, from which much instructive information is secured.

Design of Pressure Vessels

IN THIS paper by M. E. Clawson and T. O. Duller of the Continental Oil Co. there are presented a set of 12 figures covering the major parts of a pressure vessel based on the A.P.I.-A.S.M.E. codes, using 55,000-lb. carbon steel; from the data secured nomographs are constructed, from which may be ascertained the optimum economic design of unfired pressure vessels, with an accuracy of approximately one percent. The nomographs are not intended to eliminate the code, but rather to supplement it.

Highway Types and Traffic Demand

THE PROBLEM of selecting highway types according to traffic demand is discussed by H. B. Kelly of the U. S. Bureau of Public Roads. This problem has been considerably simplified by the work of the

Bureau during the past 10 years, so that it is now possible to analyze in detail the use being made of the highways, and to predict with considerable accuracy the future growth of traffic over periods of 5 or 10 years. Each highway, of course, is a problem in itself.

Gasoline Tax Diversion

C. C. CHAPMAN, editor of the OREGON VOTER, who is credited with the invention of the gasoline tax that has brought in $3,700,000,000 in 15 years, gives an entertaining history of the origin of this tax, which was originally conceived as a means of providing better facilities for automobile traffic; the object was to create a new social order through promotion of better means of communication. Unfortunately, the diversion of the proceeds of this tax has a distinct tendency to destroy the new social convenience which was created, in so far as it discourages the building of new highways and the maintenance of those already built. Restoration of the gasoline tax to its original purpose is a moral obligation.

Making Mud a Memory

WHAT ADEQUATE roads passable at all times mean to the oil industry is made clear by W. A. Hardenbergh, editor of PUBLIC WORKS MAGAZINE. The industry has a decided interest not only in the construction of new highways, but also in their maintenance. For instance, snow removal in winter is not only for the convenience of the farmer, the country doctor, the fire department or the delivery service of tradesmen. Public funds are devoted to this purpose because the increased income from the gasoline tax is greater than the cost of snow removal. The oil marketer has a decided interest in giving his approval to such expenditures. Further, two miles of low cost roads do more to promote traffic than a mile of fancy and expensive highway; growth of the low-cost road movement is therefore much to be favored, so far as it relates to the use of asphalt.

The Dealer's Place

AS B. I. GRAVES of the Associated Oil Co. sees it, the most important move of a bulk product like gasoline is into the customer's tank, hence the agency that contacts the customer is the most important link in the chain of operations of the oil industry. The author weighs the relative advantages of marketing through the "independent" who is able to control his source of supply, or through company-owned or controlled filling stations. Both have their respective advantages and disadvantages, but on balance he is inclined to favor marketing through independents because the net profit to the oil company is somewhat greater, *if* continuity of brand representation can be secured, and unethical price arrangements and price wars are avoided. The chief argument for company distribution is that consumer loyalty is in the main to the dealer, and the loss of representation means the loss of a block of consumer patronage. The author also believes that sliding differentials should be adopted to relieve the independent of more of the burden of price cutting.

Organic Content of Sediments

PARKER D. TRASK and Harold E. Hammar of the U. S. Geological Survey report on a joint research by the Survey and the A.P.I. on source beds of petroleum. A preliminary statement is presented of the organic content of producing areas of 120 formations. Many formations in which the organic content is more than two percent are associated with oil horizons, and this feature seems to be a favorable indication of source beds. It is not an absolute index, as some horizons are not associated with sediments rich in organic matter and vice versa. Some data seem to indicate that a comparatively high volatility or low degree of oxidation of the sediments may be favorable indications of source beds.

Petroleum Industry's Responsibility

AS J. E. PENNYPACKER of the Asphalt Institute sees it, the petroleum industry has a definite responsibility to the 24,000,000 motor car users in leading the fight against iniquitous taxation, and it should realize the opportunity for increased business through highway development. More attention should be paid to the causes than to the effects of gasoline taxation. The objective should be more usable highways and fewer expensive highways; that is, more mileage of road at lower cost, and also adequate maintenance of existing highways. Gasoline advertising should be definitely tied in with the highway program; more roads and less tax is a program that will gain allies against tax diversion and tax evasion.

Thermodynamics and Production Problems

THIS PAPER by W. N. Lacey and B. H. Sage of the California Institute of Technology outlines the thermodynamic properties of hydrocarbons as they are being studied in A.P.I. Research Project No. 37. Experimental methods are described and applications of the resulting information are suggested. Among these is the flow of fluids through oil sands to the bottom of the well. Problems of oil or gas transportation can be treated by the same methods. The effect of throttling in production processes can be predicted in one or two phases. It is also possible to predict the energy requirements of pumping and compressing operations. Changes in the physical state of the materials undergoing treatment can also be predicted. This information is desirable in estimations of underground reserves and proration of production by estimation of "reservoir energy."

A. P. I. Pipe Coating Tests

THIS IS a fourth progress report relating to the third inspection of pipe coating tests on operating lines and short coated specimens by Gordon N. Scott of the Bureau of Standards. Previous conclusions are confirmed and new information of practical value is disclosed. Complete prevention of corrosion has not been realized, but pitting has been materially reduced by most of the coatings. Shielding or reinforcing is recommended as a minimum practice in pipe protection under average corrosive soil conditions. Durable shields should be provided because soil stress is definitely progressive; moisture absorption is of secondary importance, and methods of reducing moisture absorption are discussed. The tests on short pipe sections of small diameter do not arrange the coatings in the same order of merit as the tests on the large operating lines.

Improved Motor Oils

PRESENT driving conditions demand that the motorist be supplied with a crank case oil that is outstanding in the following characteristics: low consumption, low tendency to form carbon, safe lubrication, steady piston seal, free flow in cold weather. These requirements indicate that motor oils with viscosity indices of above 120 and up must be produced, and many processes have been introduced to improve viscosity indices. This paper by M. Otto, F. L. Miller, A. J. Blackwood and G. H. B. Davis presents a method for producing oils with viscosity indices far beyond anything now commercially possible. This involves polymerization of certain light ends from refinery gasoline to viscous products which, when blended with lubricating oils increase both the viscosity and the viscosity index. Extensive tests have demonstrated that these oils are superior in all of the five characteristics necessary for present-day lubrication of automotive vehicles. In this type of oil there are only two grades—summer and winter.

One of the earliest Polish refineries constructed in 1870.

Grave Situation of Oil Industry in Poland

Mistaken Government Policies and Country's Low Economic Level May Force International Concerns to Withdraw Thereby Retarding Development of Polish Domestic Economy.

A SHORT-SIGHTED policy on the part of the Polish government in regard to the companies which are developing her petroleum resources has succeeded in placing these companies in a position where they are faced with bankruptcy, or withdrawal from Poland. Regulations requiring exportation of a large percentage of the total petroleum produced in Poland, when such exportation must be accomplished at ruinously low prices, and when sales on the domestic market do little more than permit the companies to recover the cost of production, is resulting in waste of the country's resources and ruin of the industry. These and other facts are ably and impartially set forth in the accompanying article and the question raised: Will Poland take advantage of the opportunity to revise its petroleum policy before it is too late?

Collecting crude oil in Poland.

IT IS a lamentable fact that Poland, which is an oil producing country and has claims to be regarded as a Great Power, has the lowest per capita gasoline consumption of any European country. Poland has also the lowest per capita automotive vehicle registration. There are three reasons for this. The first and most important is the low level of the country's economic life for which general world conditions can be held partly responsible. The second is the inexplicable policy of the government which for the past several years has made it virtually impossible to buy an American motor vehicle, with the result that Poland today has an automotive registration of less than 25,000 for a population of 33,000,000. The third is a filling-station price equivalent at present to 46 cents (U. S.) a gallon for ordinary grade gasoline, which includes 8 cents consumption tax, 6.3 cents road tax, 1.8 cents sales tax and 3.8 cents for inland freight. Social insurance charges and other odds and ends bring up the total to 21.2 cents, which means that the companies get around 24.8 cents a gallon to cover production, manufacturing, distribution and loss on export business. It only needs to be added that export losses are very heavy, and that production costs in Poland for the relative value of the crude and output per well are probably higher than in any other oil-producing country.

Approximately 80 percent of the crude production in Poland emanates from the deep wells in the Boryslav area, the average depth being in the neighborhood of 5,000 ft. and the cost approximating anything from $100,000 to $130,000 per well, which means an average "all-in" cost of more than $25 per foot, including casing. There are, roughly, 3,000 producing wells in Poland, the average daily production being four barrels per day. The high cost of drilling and the small quantity of crude obtained clearly reveal the uneconomic producing situation, especially considering that the average crude price ranges around $1 per barrel below the production cost of the same. Nothing short of a state subsidy and relief from taxation can put the producing of oil in Poland on a paying basis.

Despite high production costs, exces-

sive taxation and declining consumption, if they produced only for the domestic market the oil companies would about break even at the existing price level, which is fixed under government control. What is ruining them is the necessity of exporting about 40 percent of refinery output at external prices determined by the low production costs of other producing countries—Roumania in particular.

Due to the unbalanced consumption of petroleum products in Poland as compared with ultimate yields from the indigenous crude manufactured in the country, there always has been, and will be, a surplus of certain black products and a small quantity of naphtha which the industry will find it necessary to export irrespective of the government's ruling on forced exports (if these are curtailed). In order to supply the country's requirements of kerosene, approximately 400,000 tons of crude must be processed, thus leaving a surplus of other products, in excess of domestic requirements, of approximately 72,000 tons or, roughly, 22 percent.

The export price of gasoline (which is sold in zlotys per 100 kilograms c.i.f. Polish frontier) has fallen from an average of 43.43 ($82.51 per ton) in 1929 to 11.39 ($21.60 per ton) in the second quarter of 1934. Kerosene has dropped during the same time from 17.35 ($32.96 per ton) to 8.45 ($16.05 per ton) and gas oil from 12.55 ($23.84 per ton) to 5.34 ($10.14). But the average price of standard Boryslav crude (likewise in zlotys per 100 kilograms) has declined only from 18.53 ($35.20 per ton) in 1929 to 15.30 ($29.07 per ton) in 1934. Crude at the well thus costs 15.30 ($29.07 per ton) while gasoline delivered at the frontier for export brings 11 39 ($21.60 per ton). Composite figures for the industry as a whole show that in their operations during the first half of 1934, with reasonable allowance for depreciation, there was a loss of 484.00 zlotys ($91.96) on every tank-car (10 metric tons) of crude. The total crude production this year will be about 54,000 cars (540,000 tons), which means that the industry as a whole must expect to be 26,136,000 zlotys ($4,965,800) poorer on December 31 than it was on January 1. On the same basis of calculation, the loss in 1933 was 277.00 zlotys ($52.63) a carload, making a total of 15,716,149 zlotys, ($2,986,068) on the year's production of 56,737 cars (567,370 tons).

The question to which these figures naturally give rise is why, then, are the companies so foolish as to engage in export trade at all? Losing money and wasting the resources of the country. This is where the dead hand of official interference with the operations of the law of supply and demand comes prominently into the picture. An intricate formula has been devised for arriving at domestic sales quotas based on refinery throughput and yields. In order to maintain their position in the home market, the companies under this scheme are forced to run about 40 percent in excess of what can be sold in the country, meaning that the balance must be exported for whatever it will fetch. Exports are controlled through the Polski Eksport Naftowy, which came into existence on May 1, 1933, on the liquidation of the Petroleum Cartel. The "P. E. N." is an officially controlled organization to which all refineries over a certain capacity are forced to belong. It determines export quotas, lays a charge on export sales made directly by the member companies, and eventually equalizes export prices on the products exported. Refineries manufacturing less than 6,000 metric tons per annum are exempt from export business, but in lieu thereof they must contribute to a special drilling fund for exploration work.

Selling oil in one of Europe's most expensive markets; scene at a Polish service station.

Recently, the government, in order to stimulate activity in the domestic market, forced the industry to reduce the retail price of kerosene to the extent of 20 percent promising, in turn, a reduction in freight rates as well as sales taxes. This forced reduction of kerosene is causing much concern to the industry, particularly in view of the low purchasing power existing in the country, which makes it difficult under present economic conditions to improve the sales turnover in any great measure.

Manifestly, a system which compels refiners to export 40 percent of their production at a loss, while about breaking even on inland business, can last only so long as the companies are willing to pay out money in the hope that (1) an eventual improvement in export prices; or (2) a substantial increase in domestic business; or (3) a complete reversal of government policy in respect of domestic and export quotas will enable the industry to "turn the corner." No sane businessman can gamble any longer on points (1) and (2), so there remains for consideration only point (3) to rescue the companies from their present predicament and conserve what remains of Poland's oil industry. The original capital investment in this industry represents more than $50,000,000 (gold), including the "Polmin" refinery, the largest in Poland, which is owned by the state, but exclusive of certain very small enterprises. Not only are the investors obtaining no return on this capital, but most of it can be counted as lost. The incidence of the loss falls most heavily on those companies which have to buy outside crude in order to maintain their refinery yields for the purpose of obtaining domestic sales quotas, which in effect is discrimination against the foreign-owned refineries in favor of the so-called "pure" crude producers who are Polish. This must not be taken to indicate, however, that the buyers of outside crude have not tried to obtain their own supplies. An American company, which is now forced to buy more than 50 percent of its crude requirements has drilled 71 wells to an aggregate depth of 219,000 ft. of which 29 were dry holes.

Since the time is fast approaching when the foreign concerns that are the backbone of Poland's oil industry will decide voluntarily to withdraw from this country,—or be forced to do so because of

Primitive transportation in a Polish field; the buckets contain crude oil.

A roadside pump in Poland 41 kilometers from Lwow

bankruptcy,—the government has not much time left to realize that it is disastrous to kill the goose that lays the golden eggs. What the companies demand, in fact, is not only in their own interest, but for the nation's good—i.e., the conservation of oil reserves. They propose, specifically, that crude production should be restricted to the requirements of the home market for the main product—which is kerosene. That would leave only a small amount of gasoline and heavy products to be exported, and would conserve the crude where it belongs—in the ground. Or, alternatively, if the government insists that the present rate of extraction be maintained, the companies should be allowed to store the surplus crude or finished products, with the government providing the necessary financing facilities to enable them to do so. It would be a simple matter to arrange such financing, since the oil itself would serve as collateral. The present policy of the government, which is to obtain foreign currency through oil exports, even if the oil companies are ruined in the process, could be just as well realized by mortgaging stored oil against foreign credits, with a government guarantee if necessary.

An aggressive and enlightened policy in respect of motorization and highway construction so that motor vehicle registrations could be brought nearer to present-day requirements ought forthwith to be undertaken. The result, of course, would be beneficial for the oil industry, and there are signs that the government is about to change its automotive policy—the War Department, in fact, insists that it be changed—but this development will not come quickly enough to rescue the oil industry from its present impasse. But it could do a great deal if it were brought about in conjunction with the cessation of oil exports under the existing system.

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The Year in California Oil

ANNUAL REVIEW, California Oil Industry, 1934, published by PETROLEUM WORLD in Los Angeles, California, and available through the New York or London offices of WORLD PETROLEUM at $2.00 per copy.

This annual feature of the California oil industry which is coming to be looked for with interest by members of that branch of the oil business, includes an even more interesting selection of articles and statistics this year than in previous years. R. E. Collom, vice president of the Continental Oil Company, reviews in detail what remains of California oil reserves. Mr. Collom finds that of approximately 100 wildcats being drilled, only about four are considered to have a good chance of success and all present indications are that California is going into a "dry cycle" of exploration. As a result it may not be long before the state is faced with a shortage of available supply. Naturally this is a subject of absorbing interest to oil men in the United States and elsewhere.

Stanley Herold reviews the advance of geology and petroleum engineering in an ably written and well illustrated article entitled "Geology and Technology Go Forward." California is generally conceded to be the most advanced section of the U. S. as regards drilling practice and perhaps also in regard to geological and geophysical exploration, and this situation is fully reviewed in Mr. Herold's article.

A large map in color of the oilfields, refineries and pipelines of California appears in this issue. Developments in the Refining Industry are reviewed by Martin J. Gavin. Other articles deal with the Pacific Coast Lubricating Oil Market, Liquified Petroleum Gas, Natural Gasoline and an extremely readable article on the problems confronting the pioneer drillers in the Coalinga field.

While all the articles are interesting, particularly those by Mr. Collom and Mr. Herold, the principal feature of the book is 76 pages of statistics on every phase of the California industry as far back as records are kept and bringing the industry down to the present day. Statistics include such things as value of production, records by fields, by months, by wells, etc., in fact every kind of production record, price record, refinery information, marketing statistics, and financial records of all California companies. In addition there are dozens of other tables of important information which are too numerous to mention here.

In short, the Annual Review of the California Oil Industry in its brilliantly executed, poster-type cover supplies a detailed picture of the California industry that makes one wish that the same information could be made available for the entire United States.

Roumania

LE PETROLE EN ROUMANIE ET A L'ETRANGER, by Mihail Pizanty, published by "Cartea Romaneasca," Bucharest.

This is the 11th edition of this standard reference book of petroleum facts and statistics, in which the author continues to show his wide knowledge of the world oil industry in general and the oil industry of Roumania in particular. The present edition is divided into six main parts. It opens with a consideration of the present situation of the world petroleum market, which is illuminated by authoritative documentation. The author then considers petroleum in Roumania, and leaves little that is obscure regarding the history, geology, technology, operations in refining, transport, marketing, and legislation affecting the oil industry in his country. Next follow details regarding the important oil concerns working in Roumania. One chapter is given to a very careful analysis of the outlets for Roumanian oil. The volume closes with a succinct analysis of the oil industry in each producing country, not only as regards production and marketing, but also as regards history and legislation.

Possibility of British Tax Relief in Sight

Budget Surplus Indicates Taxation Relief on Which Petroleum Industry Has Strong Claim. National Self Sufficiency Policy May Result in Retention of Fuel Oil Tax. British Consumption.

LONDON, NOV. 12.

JUDGING by the talk of British Cabinet Ministers, the time may shortly be approaching when the British petroleum distributing industry should be able to look for some relief from its present heavy burden of taxation. A substantial Budget surplus at the end of the current financial year has been envisaged by members of the Cabinet in recent speeches, and the possibility of tax reductions in general has been discussed. The petroleum industry would certainly have an excellent claim to participate in any tax cuts which can be made.

In Britain, as in many other countries, the industry has been burdened with a heavy load of taxation for revenue purposes, and in this country the position of importers has been made additionally onerous by the measures taken in recent years to foster the home coal industry.

As a revenue producer, motor spirit has been penalised in an extraordinary way. The tax on motor spirit is of relatively recent growth, having been re-imposed, after lapsing for many years, with a 4d. per gallon duty in the Budget of 1928. Under the stress of financial stringency, the impost was successively increased to 6d. per gallon early in 1931, and to 8d. later in that year, the last addition to the duty, like other burdens imposed at that time, being accompanied by the promise of a reduction when improvement in the financial situation should have made relief possible. Apart from this undertaking, the present level of the motor spirit duty, compared with the selling price, constitutes an excellent ground for the call for reduction. The tax of 8d. constitutes at least 50 percent of the total average price at which first grade spirit is sold by petroleum companies, and is an even larger proportion of the price of the cheaper grades, which form a very considerable percentage of total sales in the British market.

Although the petrol tax at its present level may be regarded as preposterous, the objections of oil men to it are mild compared with the opposition raised by the tax of 1d. per gallon on imported fuel oils. This tax, imposed in the 1933 Budget, does not aim primarily at revenue producing, but is designed to help the British coal industry to get back part of the trade lost to oil fuels. It therefore represents a definite move to favour an uneconomic industry at the expense of efficiency, on the ground that it is better to foster home activity, at any cost.

The attitude of the British Government on reductions of oil taxation generally has not been encouraging up to the present. The world-wide movement for national self-sufficiency has taken a fairly strong root in the official British viewpoint on all questions, and its attitude in regard to petroleum has already been indicated by the British Hydrocarbon Oils Production Bill, which comes into force at the beginning of next year, and gives a guaranteed preference of 4d. per gallon over some ten years to oil derived from British coal, shale or peat. With this example of official policy, there is always a possibility that reductions of oil taxation, when they come, will be designed to assist the home industry rather than the imported product.

New statistics of British motor spirit consumption, produced by the Board of Trade, certainly suggest that demand for this product has offered a strong resistance to the disability of heavy taxation.

Compiled from the official figures, the first section of the accompanying table sets out the quantity in millions of barrels of motor spirit entered for United Kingdom home consumption during each year from 1929 to 1933, and for the first three quarters of the current year. The second section shows the same figures with each quarter's entries expressed as a percentage of the average quarterly amount for the year. This has been done by dividing the total for each year by four, and calculating the percentage of each separate quarter to the resulting figure.

Motor spirit imported as such, and spirit produced from imported oils are included in the statistics, but the small quantities derived from United Kingdom shale are excluded.

A feature of the figures is the remarkably steady growth shown by the quarterly entries of each year. It will be noticed that not only do the yearly totals show a consistent advance, but each quarter, compared with the corresponding quarters of previous years, reveals the same unmistakable upward trend.

Motor Spirit Entered for Home Consumption in Britain, 1929–34

(In million barrels)

Year	First qr.	Second qr.	Third qr.	Fourth qr.	Total
1929	5.2	6.3	7.0	5.9	24.4
1930	6.0	6.7	7.5	6.3	26.5
1931	6.1	7.4	8.5	6.4	28.4
1932	6.5	7.7	8.5	7.0	29.7
1933	6.6	7.9	9.1	7.3	30.9
1934	7.4	8.5	9.2		

Quarterly Figures expressed as percentages of average quarterly entries for each complete year. 1929–33

Year	First qr.	Second qr.	Third qr.	Fourth qr.
1929	86	103	115	96
1930	90	101	113	96
1931	86	104	120	90
1932	88	104	114	94
1933	85	103	118	94

Petroleum Imports

FOLLOWING the drop off in the amount of imports in September, October showed a marked increase in the importation of petroleum and products, being, in fact, 16.6 percent above the petroleum imports for October, 1933. This considerable increase, however, was largely due to the incidence of tanker arrivals as indicated, for example, by a 24.7 percent increase in imports of petrol in October compared with September, an increase which is obviously against the seasonal trend. The expected seasonal improvement in importation of kerosene is subnormal. A large increase in importations from America was registered in all petroleum products.

British Imports by Products

(Barrels)

	October 1934	Ten months to October 31, 1934	Ten months to October 31, 1933
Lamp oil	803,543	5,253,761	4,115,000
Motor spirit	2,901,657	27,105,911	26,735,920
Lubricating oil	239,200	2,541,171	2,553,214
Gas oil	341,143	3,255,029	2,576,075
Fuel oil	1,642,114	15,148,086	13,172,127
Other sorts	52,657	511,895	364,071
Total products	5,980,314	53,815,853	49,516,407
Crude	839,229	11,606,629	9,256,444
Total imports	6,819,543	65,422,482	58,772,851

Wood-Fuel Driven Automobiles

Gasogene Engines Being Experimented with in Europe. Universally Available Low Cost Fuel Encouraged by Governments in Hope of Discovery of Supplementary Motor Fuel. By Dr. O. W. Wilcox

EVERY once in a while somebody comes forward with a substitute for gasoline or other petroleum products as a means of propelling automotive vehicles, but after briefly serving the purposes of newspaper paragraphers such propositions have the habit of vanishing into thin air. At times it has seemed as though alcohol would claim a place as an automobile fuel, but nowhere has this substitute been able to stand on its own economic legs, and has had to be legislatively forced on motorists in order that farmers might have an outlet for surplus products.

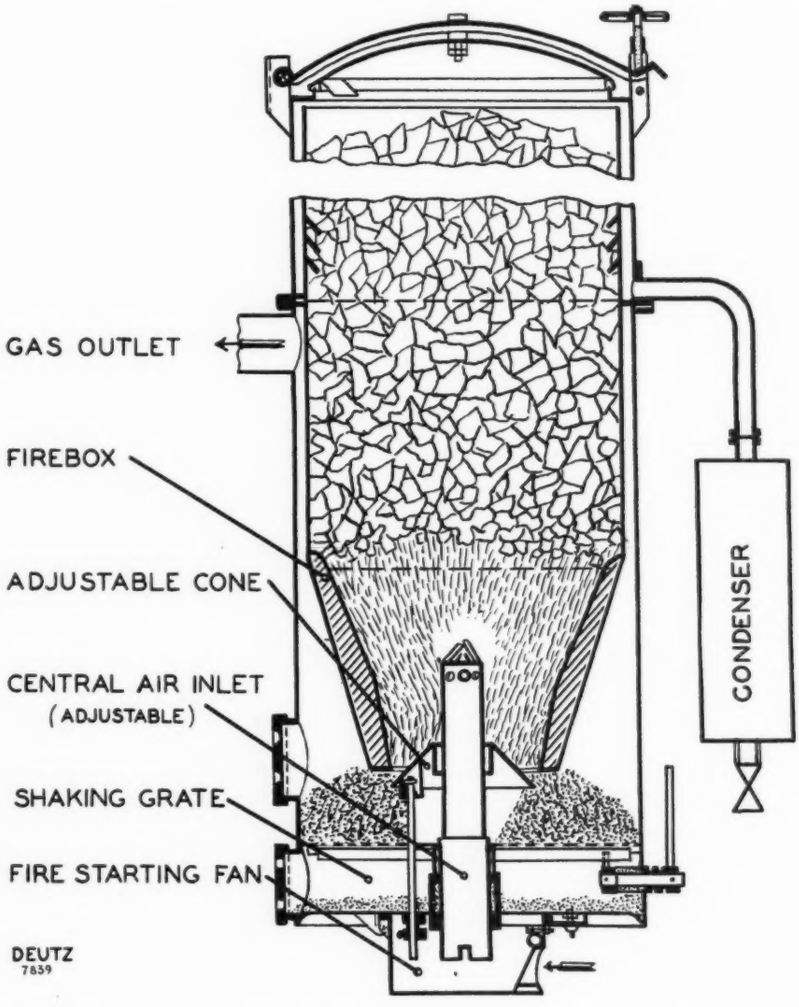
But lately it has been discovered that an old and well known source of power could be utilized in some types of automotive transportation without laying an abnormal cost on automobile users; in fact, this new-old means of propulsion seems to offer a prospect of considerable saving to automobile owners in countries where excessively high taxes on gasoline restrict the use of motor cars.

This new fuel is wood, not high-cost wood, but wood hardly suitable for other purposes, such as sawdust, forest slash, brushwood or even woody weeds. There is no dearth of such material in any country not an absolute desert, and it is not necessary to subject it to an expensive preparatory treatment, as is the case when alcohol is manufactured from farm products.

The mechanico-chemical principle is simple. Every combustion engineer is familiar with the ordinary gas generator used in many industrial works for converting low or high grade fuels into gas for use in gas engines or other purposes. In such gas generators the apparatus is charged with the fuel, a fire is started and a part of the material is burned in order to subject the rest to a dry distillation; the resulting combustible gas is led to an internal combustion engine and develops power. The new idea is nothing more than to attach one of these generators to an automobile, tractor or truck. It seems that this was first done in Finland, where there is no oil but much sawdust.

The accompanying illustration shows the general arrangement of a "gasogene" as employed on gas-driven trucks and automobiles now in use in Germany. In its upper part the generator is an iron cylinder with a tight cover; below the cylinder is a conical fire box with a refractory clay lining. There is an arrangement whereby the lower opening of the fire box can be enlarged or narrowed by an adjustable cone, and a shaking grate for removal of ash. Below the grate is a receptacle in which fuel oil or other combustible is burned to get the fire started. On the road air is drawn up through the fire by a fan under the control of the chauffeur, the wood above the fire is distilled and the gas, after passing through a centrifugal purifier to remove solid particles, is compressed and ignited in the engine. As the wood is consumed more is put in at the top. According to operating figures that have been given out, a 45-H. P. truck will make 120 kilometers on a charge of

Diagrammatic sketch of a Deutz Gasogene.



75 pounds of birch wood cut in the form of coarse chips. In some of the models of these "gasogene" driven vehicles a small amount of gasoline is used for starting and for extra power on steep grades, but this extra gasoline does not exceed more than 1½ gallons per 100 kilometers. The intensity of the fire in the generator and hence the production of gas is under easy control of the driver.

Although the idea may have originated in Finland it was not long confined to that country, and has been the subject of experiment in half a dozen other European countries. According to a report made to the German Forestry Association there are now more than 1,000 gasogenes on the German roads. Most of these use engines made by the Deutz firm, which is said to be about ready to put the new vehicles into mass production. Naturally, the German forest interests are much pleased at this new outlet for their product.

By a law passed on July 3 the Italian government has established substantial bounties to Italian manufacturers who agree to produce tractors and autobusses operating with gasogenes. Forest owners of Switzerland have volunteered to donate wood for a limited period to every purchaser of a gasogene to run on Swiss roads. The city of Pressburg has ordered 20 gasogene autobusses for municipal operation, and the city of Prague in Czechoslovakia is proceeding to put its whole autobus service on the same basis.

The French have taken up the innovation with enthusiasm. Purchasers of gasogene trucks are not only given a subvention but are allowed a substantial reduction of taxation. On October 19 and 20 the French Direction des Eaux et Forets organized a show of gasogene driven vehicles for French manufactures, and no less than four firms made entries, Gohin-Poulenc, Panhard, Berliet and Rochet-Schneider. Besides these exhibitors there was a two-ton Ford truck rigged out with a Gohin-Poulenc gasogene using wood charcoal. There were 15 entries in all, including passenger cars, commercial trucks from two to eight tons, and six military trucks of two, three and five tons capacity. The entire outfit paraded over a wide stretch of the countryside around Tulle in a demonstration of the practicability of the innovation. Encouraged by this success the government is organizing other exhibitions in different parts of the country in order to accelerate popularization of the idea.

The question naturally arises as to where the oil industry stands in the face of this new development. It is perhaps too early to cry "wolf," and there is a bare possibility that there is a "catch" in it somewhere. But the gasogene is undoubtedly a new cloud on the horizon that deserves notice even though the cloud is yet no bigger than a man's hand, and it will be worth while to take stock of the situation. In the first place it is perfectly clear that automotive vehicles driven by a fuel that is both universally available and cheap are actually coursing the highways of Europe. It is not difficult to understand the acclaim with which the gasogene has been hailed in such countries as France, Italy, Germany, Sweden, Finland, Switzerland, Czechoslovakia, Hungary and other Balkan states. These are all countries with no or very inadequate oil deposits, and some are without adequate coal deposits; for these essential materials such countries have to depend on outside sources. For such countries the situation, if the gasogene proves practical, will have changed basically almost overnight: if there is nothing below the soil to drive a nation's automobiles and tractors, at least a partial sufficiency may be had from the surface at trifling cost.

If wood eventually establishes itself as a workable substitute for gasoline, competition between the two will boil down to two issues, the question of supply and the question of price. Can a country such as Italy, for example, produce enough wood to supply the needs of that country at a price which the producers of gasoline would be willing to take?

A complete analysis of this specific case would require much time and space, but the basis on which such problems are to be solved may be here briefly indicated. It is generally allowed by forestry experts that the average annual growth of wood in well administered woodlands is at least a ton to the acre. From the thermodynamical studies on the gasogene that have been given out it has appeared that about 16 pounds of air dry wood are equivalent to one gallon of gasoline, so that the produce of one acre of forest is equivalent to about 125 gallons of gasoline, or enough to last the average autoist about three months (an estimate which is at best general and approximative). On this basis it will take four acres of woodland to keep one automobile going for a year. There are about 500,000 automotive vehicles of all descriptions in Italy; to supply them will require 2,000,000 acres of forest. This appears to be well within the forestry resources of the country. On the same basis, to keep 25,000,000 automobiles of the United States in average motion will require about 100,000,000 acres of woodland; this is but a trifle more than the area of submarginal farm land which the A. A. A. would gladly convert into forests.

But fuel for the gasogene is not necessarily limited to forestry products. There are many waste products of farming that will serve excellently. Take the cotton farmer; every 50-acre cotton plantation in the southern part of the United States that produces 25 bales of cotton also produces about 25 tons of dry, woody cotton stalks that need only to be passed through a machine that will break them into small bits. This amount of trash, which ordinarily is no small nuisance to the cotton farmer, is the equivalent of more than 3,000 gallons of gasoline, or enough to cover all possible power requirements of a farm of that size. Or take an Indiana farm that produces corn at the rate of 100 bushels per acre; each such acre will also produce nearly three tons of dry cornstalks, equivalent on a liberal estimate to 300 gallons of gasoline. With such an abundance of material now going to waste, not even the new forests that are to rise on submarginal lands would seem to have much of a chance as sources of automotive fuel in an agricultural region.

A few questions, however, arise in connection with the new type of engine and fuel. Even if automobiles of the future were to be driven by wood, they cannot be lubricated by wood. The weight of a fuel supply of wood appears to be at least double that of gasoline. And the superior ease and convenience of liquid fuel will always recommend it to motorists as it has to ship owners. A careful examination of the relative efficiency of the two fuels and engines in comparison to the costs will probably prove again that the most efficient engines for future motor vehicles will be gasoline or Diesel. Wood fuel driven engines may find their place in emergency transportation or in countries where petroleum tariffs and taxes are so high that the consumption of gasoline is at best relatively low.

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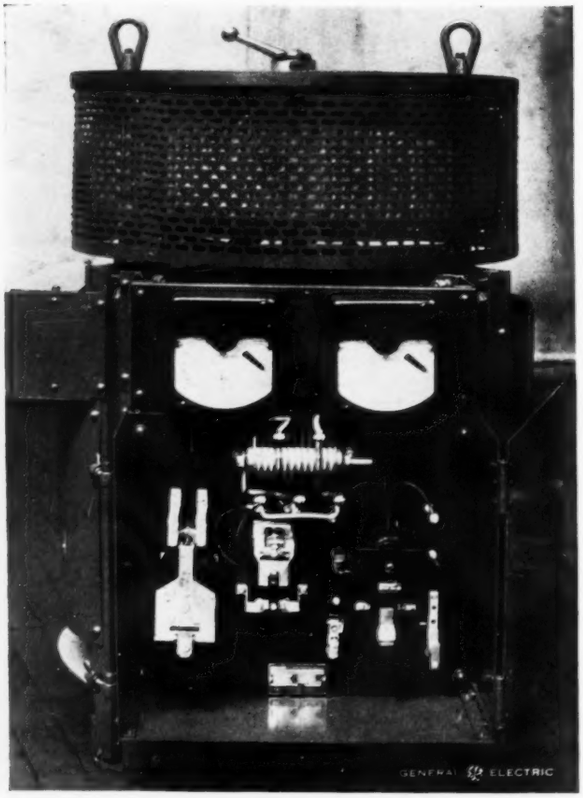
DURING November announcement was made of the sale of the Gulf Oil Corporation's interest in the Near East Development Corporation to the Standard Oil Company (N. J.) and Socony-Vacuum. The Near East Development Corporation was the company that represented the American oil companies in the Iraq Petroleum Company to the extent of 23¾ percent. It was originally composed of five American companies, Pan-American Petroleum and Transport, Gulf Oil Corp., and Atlantic Oil Company as well as the Jersey Standard and Socony-Vacuum. The three former companies have now sold their interest to the two latter, principally, it is understood, because of lack of facilities for disposing of Iraq oil.

Welding used on a complex system of pipe connections illustrating the great flexibility of this method of making connections.

Automatic Arc Welding for Pressure Vessels

By O. A. Tilton

Industrial Engineering Dept.
General Electric Co.



Arc-welding transformer made by General Electric Company.

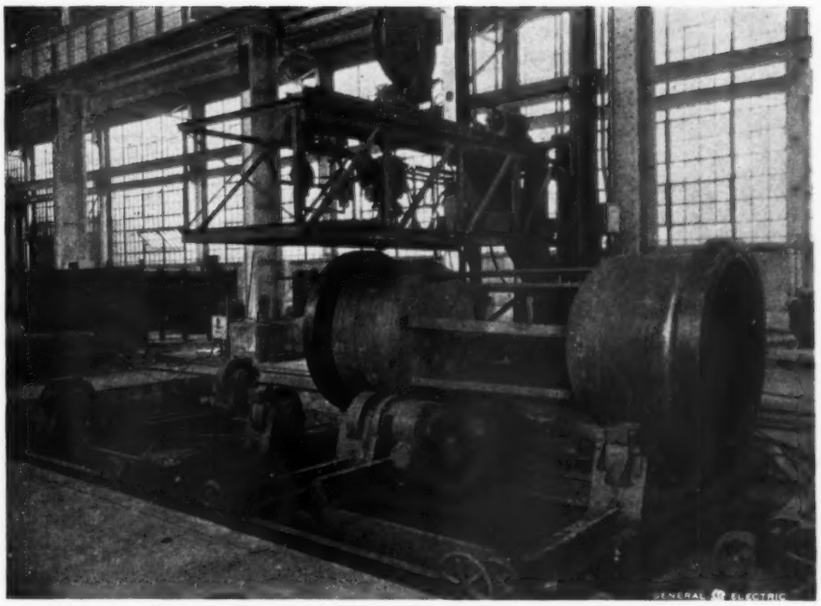
THE OIL industry has profited to a considerable extent in the last five years, from the rapid development of arc welding equipment and processes. Welded joints are now commonly made of an efficiency equal to that of the parent rolled plate stock. As a result, stronger pipe is available and lighter gauges can be used for the same pressures or higher pressures without increase in pipe thickness. Besides this improvement in the quality of the pipe, the same high quality of welding may be done on the field joints of transmission lines, thus avoiding leakage losses, decreasing the cost of installation and very largely eliminating the high cost of joint maintenance.

The illustration at the top of this page shows a typical welded piping system and clearly indicates the great flexibility of design that the welding process permits.

Storage tanks are now erected by welding, which has practically supplanted riveting as the standard method of construction.

In refineries, high pressure and high temperature cracking stills and similar vessels of welded construction are quite universally used. Such vessels have resulted in greater production from the crude oil, due to the possibility of increasing pressures and temperatures up to the safe limits of the materials of which they are made. The refinery has also profited by the greater ease and economy with which intricate piping systems can be installed.

The present day arc welded joint has much to attract the



Automatic arc-welding machine with motor driven rolling device.

attention of oil producers. For a given specification of steel there are electrodes available, with which joints are easily made of equal tensile strength, yield point and ductility to that of the plate itself as well as of such grain structure that corrosion is no greater than in the parent metal.

Practically all of this advance is due to welding electrode development. The type of electrodes referred to are heavily coated with the required fluxing ingredients. The function of this coating is to shield the molten metal from the detrimental effects of oxygen and nitrogen from the surrounding air, as well as to alloy the deposit in its formation and partially heat treat the metal and refine its grain structure. A typical electrode of this type consists of a mild steel base wire about which is wrapped a fabric covering which acts as a binder for the flux with which it is heavily impregnated. Outside of this coating is wrapped a spiral colored thread which serves as a means of identification as well as adding something to the mechanical strength of the coating.

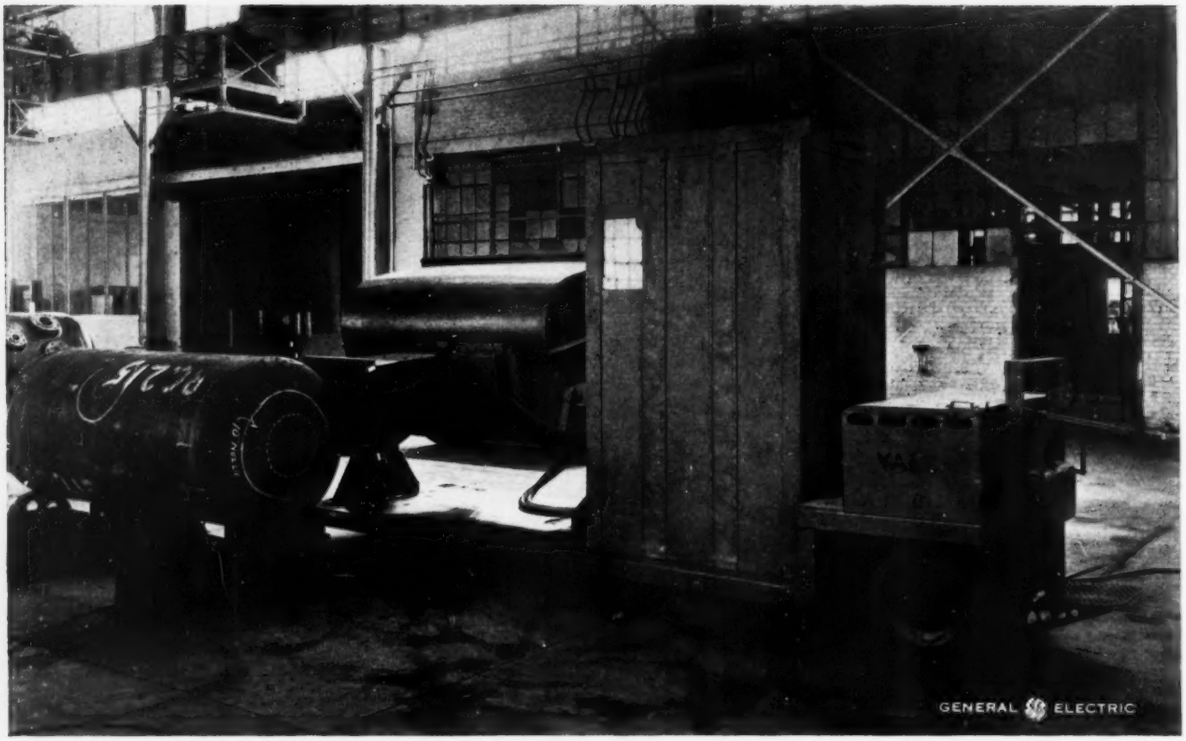
Heavily coated electrodes are sometimes also known as the shielded arc type. As well as producing high quality result, they have also made possible the use of alternating current without conversion to direct current. Automatic welding machines have also been improved to permit applying shielded arc welding to the machine process. This avoids many of the variables incident to the human element in hand welding and saves the loss of material in unconsumed short ends.

An accompanying illustration shows the automatic welding machine for the longitudinal and circumferential seams of Class I pressure vessels. The automatic welding head is mounted on the bridge of this structure and may be raised or lowered for the various diameters of vessels. This bridge is motor driven and moves along the seam parallel to the axis of the work or it may be held stationary and the work rotated by the motor driven rollers on which it is mounted.

Preparation of the plate stock is relatively simple. It is purchased from the mill, with its edges planed to dimension for the welding groove. Thicknesses up to and including one half inch use a 35 degree straight bevel. Heavier plates use a U-shaped bevel, with its sides sloped at an angle of about nine degrees. The plates are rolled into cylindrical form and the edges tack-welded together by hand. A strip of one and one quarter inch by one eighth inch steel is also tack-welded to the back of the seam as a temporary backing-up for the weld. Where the size and thickness necessitate, braces are fastened inside these cylinders to hold them to shape during welding.

When the work has been placed on the automatic machine, the seams are completed in as many layers as necessary not only to fill the groove but also to build up a small amount of excess metal at the top. Each layer of weld metal is not over one eighth inch thick and each subsequent

Electric strip heaters to provide heat for machines, processes and other out-of-the-way locations.



Arc-welded pressure vessel being X-rayed by portable General Electric X-ray equipment.

layer serves to refine the grain of the previous deposits. The last operation is to chip off the backing strip and fill in by hand any depressions on the back of the seam. In some cases, both sides of the weld are chipped flush with the plate, depending largely upon the service for which it is intended.

Every inch of welded seam in Class I vessels is examined by powerful X-ray equipment. An accompanying illustration shows a vessel set up for X-ray examination with the most modern, portable type equipment now available. Each defect found by this examination is chipped out and rewelded until further X-ray photographs show freedom from flaws. The average percentage of defects is .04 percent.

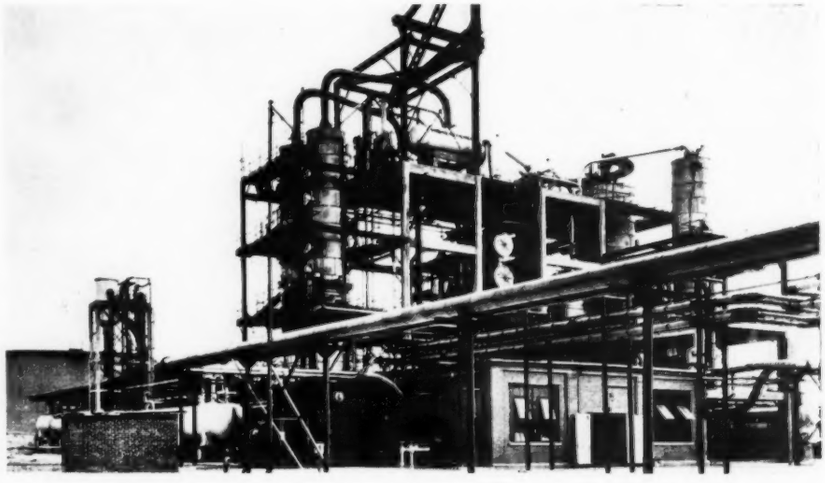
Strain relief annealing is resorted to on all such work. This operation immediately follows the X-ray. It consists of raising the whole vessel to 1,200 deg. F. and maintaining at this temperature for one hour per inch of maximum plate thickness, then cooling slowly in the furnace, to 500 deg. F. and in air to ambient temperature.

Fittings such as manholes and nozzles are welded by hand and of course receive the same treatment as the automatic welds. The nature of these fittings is such that the welding has to be done in all positions, vertical, overhead and flat. One of the advantages of the type of electrode used on this work, in combination with a.e., is that it can be used not only on the automatic but also on the hand welding, both with the same high quality results.

There still are some engineers in the oil industry, who are loath to adopt welding in the phases of their work which have been touched on in this discussion. It seems, however, that there is now ample evidence that welding has passed completely through the experimental stage and that one can hardly fail to recognize not only its reliability but its opportunities for economy as well.

Paulsboro Plant Formally Opened

THE formal opening of the Socony-Vacuum plant at Paulsboro was held in November. The plant, constructed from designs by Max B. Miller and the engineering staff of Socony-Vacuum, has a capacity of more than 3,000 bbl. per day and the process is known as the Clearosol Process. The Clearosol Process, by the use of selective solvents, refines motor oils by what is said to be the most efficient and flexible method in use at present. Below is reproduced an illustration of the towers, heat exchangers and condensers of the Paulsboro plant. Socony-Vacuum has recently completed a similar plant at Beaumont, Texas.



Foreign Oil Legion

By the recent death of Senator Alessandro Martelli, former President of the Azienda Generale Italiana Petroli (A.G.I.P.), the Italian petroleum industry lost one of its outstanding figures. At the inception of the Fascist movement he abandoned a professorial career and was assigned by Il Duce a prominent part

H. E. Senator Alessandro Martelli

in reshaping the new economic life of the country. As Minister of Economics he contributed notably to a solution of the problems of the national fuel supply, by encouraging exploration for petroleum. To him was confided the delicate and difficult task of organizing and ruling the A.G.I.P. which is now the instrument by which the Fascist government regulates marketing and encourages domestic production, and which is a conspicuous monument to Senator Martelli's constructive genius. The present special section of the parent organization for conducting exploration for oil in Italy and Albania was founded by him, and was an activity in which he took a vast interest.

Senator Martelli recently prepared a most interesting article on the aims and operation of A.G.I.P. which was published in English and Italian in the October issue of World Petroleum.

K. R. Kingsbury, president, Standard Oil Company of California, left California for Europe on Saturday, October 20.

Wilfred E. Gooday, manager of the technical department of Vacuum Oil Company for over twelve years, has resigned his position. Mr. Gooday, who is a member of the Council of the Institution of Petroleum Technologists, will be in Europe on a visit until the end of November. Lieut.-Col. S. J. M. Auld has been appointed chief technologist to the Vacuum Oil Company.

R. N. Fridman, who for some time was vice-chairman of the R.O.P. Ltd. in London, and who returned to Russia, has been made financial-director of Soyusnefteexport.

B. J. Todd, general manager, Associated Motorists Petrol Co. Ltd., Wellington, New Zealand, is on a trip to Europe via the United States. His company handles the marketing of Soviet petroleum products in New Zealand.

William Arthur Turner, F.C.I.S., retired last month from the secretaryship of Venezuelan Oil Concessions and numerous other British companies affiliated with the Royal Dutch-Shell Group. He has been in the oil business for 36 years, for 23 of which he has been associated with Royal Dutch-Shell.

R. C. Martin, General Manager of Royal Dutch-Shell affiliates in the Egyptian area, has retired. Born in 1886 and educated at Stockton Grammar School and Cambridge, he entered the Royal Dutch-Shell Group's service in 1908. After being stationed in South China and Singapore, he was transferred to Egypt and was appointed General Manager.

S. L. Niginsky, formerly director of R.O.P. Ltd. in London, is now vice-chairman of Grozneft.

A. W. Herrington

A. W. Herrington, president, Marmon-Herrington Company, Inc. recently returned to the United States from his annual trip to England and Europe. Mr. Herrington said that business conditions showed a considerable improvement, particularly in England. Mr. Herrington found a definite air of optimism and prosperity in England and spoke particularly of the increased activity of the automobile industry. He also found that Diesel driven trucks were growing in popularity in Europe even more rapidly than they are in the United States.

A. W. Haglund, Axelson Manufacturing Company, is at present on an extensive tour of the South American oil fields on business of his company. Mr. Haglund is making the entire journey by air.

A. W. Haglund

World Oil Production—Official Figures for 1934 Revised

All figures furnished direct to WORLD PETROLEUM by Governments, except where otherwise specified

(Figures in U. S. Barrels—Conversion ratio 7 bbl.=1 ton)

Country	October 1933	November 1933	December 1933	January 1934	February 1934	March 1934	April 1934	May 1934	June 1934	July 1934	August 1934	September 1934
United States	76,017,000	69,755,000	72,060,000	71,976,000	65,450,000	75,548,000	75,796,000	79,870,000	80,040,000	81,548,000	79,058,000	75,810,000
Russia	14,595,000	13,479,200	12,591,600	13,356,000	12,488,900	14,644,000	14,081,900	14,315,000	13,966,400	14,297,500	14,287,700	13,924,400
Venezuela	10,852,653	10,843,910	11,253,704	11,091,415	9,921,765	11,238,717	11,185,076	11,768,799	12,500,307	12,193,307	12,505,304	12,381,159
Roumania	4,502,127	4,000,000	4,515,000	4,906,000	4,440,000	5,066,000	4,981,000	5,258,000	5,228,000	5,223,000	5,556,000	5,560,000[1]
Persia[2]	4,549,867	4,199,797	4,422,096	4,164,790	3,988,502	4,483,535	4,284,231	4,648,105	4,399,045	4,577,251	4,886,462	4,955,419
Mexico	2,429,072	2,833,630	3,259,258	3,113,707	2,863,088	3,183,923	3,206,490	2,714,828	2,918,793	3,303,055	3,434,516	3,276,606
Netherland India	3,179,043	3,127,047	3,414,754	3,376,674	3,185,091	3,631,726	3,489,024	3,609,816	3,577,056	3,678,745	3,456,215	3,410,785
Colombia[1]	1,087,397	999,253	995,605	1,012,780	903,471	1,017,147	1,193,736	1,730,095	1,683,691	1,646,739	1,691,314	1,627,632
Argentina	1,146,392	1,296,166	1,216,461	1,241,591	1,111,358	1,231,978	1,128,922	1,029,074	1,096,855	1,077,502	1,210,273	1,350,000[1]
Peru[1]	970,427	998,066	1,178,004	1,188,340	1,041,658	1,086,827	1,037,127	1,085,192	1,187,030	1,233,804	1,300,253	1,259,901
Trinidad	818,184	788,970	799,484	852,189	766,254	876,544	876,950	926,785	947,122	1,008,669	975,697	919,469
British India	680,880	667,719	701,478	782,743	699,369	808,647	759,977	796,208	749,294	700,000[1]	700,000[1]	700,000[1]
Poland	312,956	309,624	311,500	312,333	281,946	310,800	304,500	305,592	304,437	315,861	320,145	311,003
Sarawak	186,431	179,648	176,008	172,172	158,361	176,568	166,999	166,565	158,669	164,206	161,504	155,400
Japan and Taiwan	116,957	111,127	114,082	112,927	99,481	109,303	111,794	118,578	120,390	130,284	135,000[1]	137,000[1]
Egypt	125,786	128,450	127,421	122,934	109,900[1]	121,121	117,236	130,851	132,097	135,106	131,061	130,500[1]
Ecuador	141,379	133,591	138,198	132,653	120,900	131,566	135,226	142,869	158,826	141,474	140,944	136,033
Canada	97,132	108,304	113,677	124,425	116,546	130,046	118,890	117,693	109,021	120,772	114,778	114,242
Germany[3]	160,951	157,808	155,491	152,292	138,593	159,096	176,071	159,103	179,480	208,145	219,961	198,366
Iraq[1]	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
France[1]	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000
Others[1]	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000
Total	122,151,634	114,249,304	117,725,821	118,374,167	108,067,183	124,137,544	123,333,149	129,075,153	129,638,513	131,885,420	130,467,127	126,539,915

[1] Estimate. [2] Anglo-Persian Oil Co. figures revised; fuel oil returned to the ground has been deducted. [3] Thuringia estimated 7,000 bbl.; official figure for Prussia. Russian Sakhalin included with Russia. Japanese Sakhalin included with Japan. [4] International Petroleum Company's figures.

Official Crude Oil Production Figures for 1932, 1933 and First 9 months of 1934

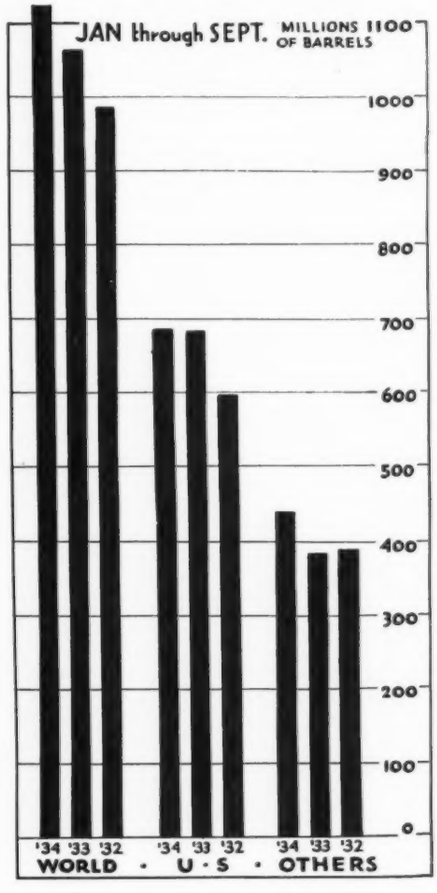
(Barrels of 42 U. S. Gals.)

	Total 1932	Daily Average 1932	Total 1933	Daily Average 1933	Total 1934	Daily Average 1934
United States	785,159,000	2,145,243	898,874,000	2,462,670	685,096,000	2,537,392
Russia	149,719,000	409,070	149,901,900	407,950	125,361,800	464,302
Venezuela	119,596,512	326,766	120,882,802	331,186	104,785,849	388,095
Roumania	50,491,205	137,954	50,971,200	139,647	46,218,000	171,177
Persia	45,122,455	123,285	49,581,280	135,840	40,387,340	149,592
Mexico	32,802,285	89,624	33,904,882	92,890	28,015,006	103,759
Netherland India	39,584,027	108,153	38,512,663	105,516	31,415,132	116,352
Colombia	16,384,956	44,768	13,157,127	36,047	12,506,605	46,320
Argentina	13,166,900	35,975	13,759,565	38,232	10,477,553	38,805
Peru	9,899,266	26,026	13,923,281	38,146	10,420,332	38,593
Trinidad	10,023,780	27,387	9,560,039	26,192	8,149,679	30,183
British India	8,600,312	23,500	8,721,665	23,893	6,696,238	24,800
Poland	3,905,230	10,670	3,858,085	10,570	2,766,617	10,246
Sarawak	2,274,043	6,213	2,289,472	6,273	1,480,444	5,483
Japan and Taiwan	1,575,333	4,375	1,377,761	3,827	1,074,757	3,980
Egypt	1,742,370	4,760	1,591,495	4,360	1,130,806	4,188
Ecuador	1,573,857	4,300	1,622,624	4,446	1,240,493	4,594
Canada	1,054,373	2,880	1,147,825	3,144	1,066,413	3,949
Germany	1,824,019	4,983	1,712,823	4,692	1,591,107	5,892
Iraq	1,200,000	3,300	1,200,000	3,288	900,000	3,333
France	552,000	1,508	552,000	1,515	414,000	1,533
Others	432,000	1,180	432,000	1,184	324,000	1,200
Total	1,296,712,823	3,544,940	1,417,312,555	3,884,022	1,121,518,171	4,153,768

Three Quarters 1934

FOR the first three quarters of 1934 world production of crude oil amounted to 1,123,186,459 bbl. compared with 1,063,163,224 bbl. in the same period of 1933, an increase of 60,023,235 bbl. or an increase of 5.64 percent. The United States increased production during this period from 681,032,000 bbl. in 1933 to 685,096,000 bbl. in 1934, an increase of 4,064,000 bbl. or 0.59 percent. All other countries of the world increased production during these nine months from 382,131,224 bbl. in 1933 to 438,090,459 bbl. in 1934, an increase of 55,959,235 bbl. or 14.62 percent.

Comparison of crude oil production in the United States, all other countries and total for the world during January through September, 1932, 1933 and 1934.



MEXICO

Petromex

CONSTITUTION of the Compañia "Petroleos de Mexico," S. A. (PETROMEX), the semi-official enterprise the federal government organized to engage in all branches of the petroleum industry and which will have a capital of 20,000,000 pesos (approximately $5,600,000, U. S.), half supplied by the national administration in the form of concessions, oil lands, etc. and the remainder by stock sales to the Mexican public, was consummated at a meeting of stockholders' representatives in the Ministry of National Economy. It was announced at the meeting that through its executive president, Engineer Mariano Cabrera, the National Railways of Mexico acquired 2,000,000 pesos of PETROMEX stock. The public subscribed 4,062,100 pesos.

The meeting approved a proposal to make the company a society of variable capital, one which can increase or decrease its capital, in accord with the new mercantile societies law which allows anonymous societies to do that without having to alter their statutes each time such action is necessary.

The following administrators and commissionaires were elected to serve for the company's first fiscal year:

Representing "A" stock, that held by the federal government: Proprietory counsellor, Lawyer Primo Villa Michel, minister of National Economy; Engineer Trinidad Paredes, director of Administrative Control of National Petroleum, and Fernando Iglesias Calderon; substitutes: Engineer Enrique Ortiz, subsecretary of National Economy, Engineer Jose Colomo and Lawyer Manuel Sanchez Cuen; proprietory commissionaires: Engineer Manuel J. Zevada and substitute commissionaire: Engineer Jose S. Noriega, chief of Ministry of National Economy's petroleum department.

Representing "B" stock, that held by the Mexican public: Proprietory counsellors: Engineer Mariano Cabrera; Lawyer Nicanor Gurria Urgel; Engineer Ricardo Jordan and Juan Platt, treasurer of the National Railways; substitute counsellors: Antonio Diaz Lombardo, Nicolas Gonzalez, Lawyer Aaron Saenz, mayor of Mexico City, and Alejandro Noye; proprietory commissionaire: Tomas Vilchis, and substitute commissionaire: David Thierry.

A presidential decree orders the abolition of Administrative Control of National Petroleum which the government established some years ago. Properties, assets, etc. of the Control are being assembled for delivery as part of the national administration's contribution to PETROMEX stock. Liquidation of the Control will be conducted by a committee of three —Engineer Trinidad Paredes, Administrative Control's director, and a representative each of Ministries of National Economy and Finance. Liquidators have been granted 60 days in which to wind up the Control's accounts. Its property includes a small refinery at Tampico, producing wells and oil lands.

Ministry of National Economy emphatically denies rumors in Mexico City oil circles that all operations of Compañia de Petroleos de Mexico, S. A. (PETROMEX), have been suspended. Development of PETROMEX'S program is being pushed, ministry says, and this work has not been slowed down pending the inauguration of the new president, Gen. Lazaro Cardenas, on Dec. 1. Ministry officials assert that Gen. Cardenas is in complete accord with the PETROMEX proposition which was initiated by President Abelardo L. Rodriguez, and that he will further its advancement during his administration. PETROMEX officials are now concentrating upon the liquidation of Administrative Control of National Petroleum, the agency the federal government conducted for some years, assets of which a recent presidential decree stipulated will constitute part of national administration's contribution of 50 percent of PETROMEX'S capital. PETROMEX has established offices at Avenida Madero, No. 40, Mexico City.

DOUGLAS GRAHAME

U. S. S. R.

Official Figures for Soviet Oil Operations

Month	Crude Production (bbl.)	Daily Average (bbl.)	Run to Stills (bbl.)	Drilling (feet)
January	13,356,000	430,840	11,680,000	317,011
February	12,488,000	446,000	10,621,800	321,509
March	14,644,000	472,000	12,257,000	360,096
April	14,081,000	469,397	12,637,100	353,311
May	14,315,000	461,774	13,101,900	384,793
June	13,966,000	465,546	12,363,400	385,387
July	14,397,000	461,210	12,744,900	402,267
August	14,287,700	460,893	12,693,200	353,099
September	13,924,400	464,147	11,969,300	318,123
October[1]	14,260,090	460,000	12,590,000	312,000
Total 10 months 1934	139,629,190	459,306	122,658,600	3,507,596
Total 10 months 1933	123,757,200	407,096	109,356,100	2,247,343
Total 1933	149,901,900	407,950	131,591,300	2,789,253
Quota 1933	170,800,000	467,670	135,000,000	3,315,000
Quota 1934	214,900,000	588,876	161,000,000	4,950,000
Possible Production 1934	170,000,000	466,000	146,000,000	4,200,000

Crude conversion: one ton = seven bbl. [1] Provisional figures.

AT A special conference held between the Central Committees of the Baku Communist Party and the Azerbaidzan Regional Communist Party under participation of the management and other responsible representatives of the Baku oil fields, cognizance was taken of the fact that of the total of 133,000,000 bbl. of the 1934 crude production quota for all Baku oil fields, 94,500,000 bbl. of crude were produced during the first nine months of the year, and orders were issued to the effect that not less than 38,500,000 bbl. of crude shall be lifted by all Baku oil fields during the remaining three months of the year.

A fixed daily average quota for crude production has been ordered for the Baku oil fields amounting to 392,000 bbl. per day in October; 385,000 bbl. per day in November, and 378,000 bbl. per day in December.

Plan fulfillment for the past 10 months of all Soviet oil fields has amounted to 82 percent and the arrears of production for all Soviet oil fields have amounted to about 40,000,000 bbl. against plan.

Baku

CONSIDERABLE progress has been noticed in mechanized production in the first 10 months of this year at Baku. Compared with the figure for the same period of last year mechanical production shows an increase of 34 percent. Not only are more wells producing under mechanized production, but a substantial improvement in operations has taken place. However, this all was insufficient to offset the arrears incurred by the gusher division or by the general shortage of wells newly completed and brought under operation.

Water has appeared in the Kala oil field of Baku giving rise to a suspicion that the field was exhausted. Closer investigation, however, has led to readjustment of drilling and the condition has been corrected. At Kara Chukhur field crude production has decreased considerably owing to lack of compressors.

Grozni

GENERAL operations of crude production and drilling are not without bright spots, but the total showings are unsatisfactory owing to lack of explored areas for drilling and insufficient study of the reserves at hand. At new Grozni (Molgabek) all 50 wells under drilling have reached what should be the producing sand. However, geological difficulties were encountered and production has been delayed. The eastern region of Molgabek requires mechanical lift, and the western region has not been tested to the XVII horizon where production is expected. Two or three wells sunk in the northwestern section of Molgabek have already come in unexpectedly as producers.

Other Soviet Fields

ACAD. I. GUBKIN has once again pointed out the importance of Middleasia as an oil region where exploration and prospecting have confirmed the presence of rich oil deposits in the Ferghana valley at Changir Tash, Riothan and at Sokha. At present the region of Handag is under test. Production has been brought in from five individual anticlinal folds known as Utch-Kizil, Gadshak, Kumkurgan, Djairan-Khan and Tuayevsk. Three rotary drilling outfits are under operation at present and four more outfits are to be installed shortly at Handag and the total area under operation will be enlarged to 600 hectares.

The oil field Handag is situated in the Turcoman Republic. The oil produced from this field contains about 70 percent of white products.

Commercial production will be initiated in 1935 with a view to meeting the local Middleasia oil requirements which amount to about 7,000,000 bbl. of oil products per year.

Considerable progress is being made in the eastern oil regions of the U. S. S. R. where rich oil deposits were discovered. Several new producing wells have been completed at Ishimbayevo and are producing about 2,800 to 3,000 bbl. of crude per day.

Commercial production at Ishimbayevo began immediately after completion of the railroad between the oil fields of Sterlitamak and Ufa and several shipments of crude from the oil fields to Ufa were made.

At a conference held in Moscow on Projecting and Building of Refineries recently it became evident that the Soviet oil industry now finds itself almost wholly unprepared for problems of refinery building during the next three years of the Second Five Year Plan.

During the First Five Year Plan, or rather, during the three years 1928–1930, over 91,000,000 bbl. of refining capacity were added to the existing installations and the growing requirements of the country under the ambitious plans for industrialization, have necessitated an increase of the existing capacities at the rate of from 105,000,000 bbl. to 120,000,000 bbl. of refining capacity per annum.

At the Conference it was asserted that Soviet experience in oil technology and in processing technique, particularly in cracking, is as backward as its experience in design and erection of refining capacity. The main problems which the Soviet oil industry is facing at present are:

1. Geographical distribution of refining facilities.
2. Depth of refining processes.
3. Machine building for the oil industry.
4. Projecting, design and scientific research.

In regard to projected refinery construction it will be noted that Baku and Grozni are unfavorably situated in regard to the main consuming centers such as the districts of Moscow, Leningrad, Janovsk, Voronesh, Kursk, Gorki and so forth: but the greatest concentration of refining capacity is found at Baku and Grozni. Transportation of oil to these points from the Caucasus involves hardships on the railroads and causes high losses of white products. It is therefore evident that all refinery erections of the future will be carried outside of the Caucasus and nearer to the points of consumption.

Except refinery erection in new oil fields, which will depend upon specific characteristics of the crude, all new refinery construction will be carried on with a view to attain:

(1) Uniform transportation to refineries of crude only. (2) Less hauling distance for refined products to points of consumption. (3) Utilization of waterways and pipelines for transportation of refined products in order to alleviate the strain on railroad transportation.

J. WEGRIN

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Gulf Export Prices for Major Oil Products

Product		Cents per Gallon			
		Oct. 15	Oct. 25	Nov. 5	Nov. 15
Gasoline:	U. S. Motor	3¾	3¾	3¾	4
	64 66–375 E. P.	4⅜	4⅜	4⅜	4⅜
	59 Oct. & below	4½	4½	4½	4⅜
	65 Oct. & above	5	5	5	5
Aviation Gasoline:	73 Oct. & above	10½	10½	10½	10½
Kerosene:	44 w.w.	4¼	4¼	4¼	4¼
	41–43 w.w.	4	4	4	4
	41–43 p.w.	3¾	3¾	3¾	3¾
Gasoil:	26–30 transluse.	3¼	3¼	3¼	3¼
	30 plus transluse.	3½	3½	3¼	3⅜
Fuel Oil:	Bunker purposes (per bbl.)	$1.00	$1.00	$1.00	$1.00
Grade C:	Cargo lots (per bbl.)	$ .75	$ .70	$ .75	$ .77½
	Diesel oil (per bbl.)	$1.70	$1.70	$1.70	$1.70
Lubricating Oil:	Bright Stock No. 8	27	27	24	24
(New York Export	Bright Stock No. 6½	26	26	23	23
Market)	Warren E.	22½	22½	19½	19½
	600 Unfilt.	18	18	15¾	15¾
	650 Unfilt.	20	20	18½	18½
	600 Flash s.r.	21	21	19½	19½
	630 Flash s.r.	25	25	23½	23½
	Neutral 200 No. 3	34½	34½	35	35
	Neutral 150 No. 3½	28	28	28	28
	300 No. 3 pale	7	7	7	7
	500 3½ pale	7⅞	7⅞	7⅞	7⅞
	750 4 pale	8¾	8¾	9	9
So. Texas:	1200 4 pale	9¼	9¼	9½	9½
	500 No. 5–6 red	7⅞	7⅞	7⅞	7⅞
	750 5–6 red	9	9	9	9
	1200 5–6 red	9½	9½	9½	9½
Crude Oil:	East Texas crude delivered at Gulf port for Export	$1.18	$1.12	$0.93	$1.17½

Roumanian Export Prices

	Oct. 1	Oct. 16	Oct. 22	Nov. 5	Nov. 12
Light gasoline (¢/gal.)	5.14	5.35	4.55	4.63	4.86
Heavy gasoline (¢/gal.)	4.06	4.27	3.61	3.71	3.83
Gas oil ($/ton)	8.70	8.65	8.23	8.18	8.38
Kerosene ($/ton)	10.15	10.30	8.25	8.59	9.41
Fuel oil ($/ton)	5.59	5.77	5.76	5.73	6.54

UNITED STATES

	Daily Crude Oil Production Bbl.	Daily Runs to Stills Bbl.	Total Motor Fuel Stocks Bbl.	Imports for week Bbl.	California Shipments East for week Bbl.
Week ending Oct. 20	2,511,500	2,495,000	52,069,000	884,000	333,000
	534,000*				
Week ending Oct. 27	2,445,000	2,445,000	51,325,000	893,000	279,000
	513,500*				
Week ending Nov. 3	2,294,500	2,315,000	50,560,000	1,208,000	99,000
	415,000*				
Week ending Nov. 10	2,410,000				
	420,500*				

Underlined figures indicate improvement in statistical position—decrease in production runs to stills, gasoline stocks and imports.
*Estimated total production of the Rusk-Gregg field, East Texas; official and unreported.

Interstate Shipments

As was repeatedly predicted in these columns the federal control agencies under Secretary of the Interior, Harold L. Ickes, were forced during October to abandon entirely efforts to control minutely every phase of the oil industry throughout the United States, from location of wells to retailing of gasoline, and to concentrate their efforts on the principal disturbing factor, the East Texas field, and, in the only way not interfering with rights and jealousies of individual states, through rigid control of interstate shipments. The surprising feature of this change in federal policy, greatly speeded up by cuts in crude oil by several independent purchasers and ruinous gasoline retail wars elsewhere in the country, was its immediate and complete effectiveness. The success of the federal "tender board" plan has been due to full cooperation of state officials, since the new plan does not in the slightest affect the internal affairs of Texas, and to compliance of all the railroads in the East Texas district with federal tender regulations, whereas formerly similar state orders were disregarded by the carriers either directly or under injunctions of minor state district courts. Inevitably the affected oil companies, which moved most of the illegal oil and gasoline, appealed on November 1 to federal courts through their attorney, F. W. Fischer, challenging the legality of and seeking to restrain the federal tender board, and obtained a hearing due November 17 in Tyler, Texas, before federal Judge Randolph Bryant. However, Judge Bryant refused to grant a temporary restraining order against the new tender board, though he ordered removal of the board's stop order on some sixty cars of oil products loaded before October 25, the date the new regulations became effective. Inasmuch as the present orders of the Petroleum Administrator concern themselves with purely interstate commerce, traditionally within the power of federal government, it is anticipated that the new federal tender board will be sustained in courts.

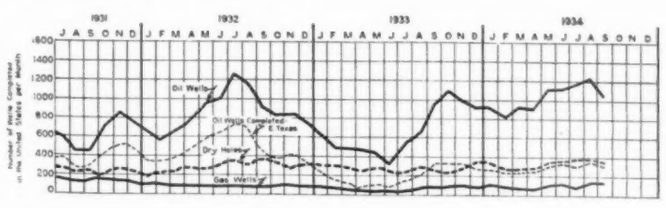
The actual developments in the East Texas field during late October and early November shaped themselves as follows: between October 20 and 25 four minor crude oil purchasing companies reduced prices from $1.00 to about 60 cents a barrel; major companies did not follow the cut under the influence of federal government, and were promised, in fact, strict enforcement of interstate shipments from the East Texas area. On October 20 Secretary Ickes issued the order, effective October 25, requiring federal permits for all interstate shipments of oil and its products from East Texas, the permits, certifying that oil was produced in conformity with law and oil code, to be issued by a three-man federal tender board. To the federal tender board were appointed Norman L. Meyers, as Chairman, Ralph Horween, executive assistant to the Petroleum Administrator, and J. Howard Marshall, of the Petroleum Administrative Board. Simultaneously, for more efficient and accurate refinery control, the East Texas area was placed as a separate refinery subdistrict. By October 29 gasoline prices rebounded in Dallas and Fort Worth to 16/18/20 cents per gallon from 9/11/13 cents per gallon for the three respective grades. And while, in the middle of October, 66 refineries were operating and 16 shut down in East Texas, by October 27 the number of shut down refineries increased to 39 and by November 1 to 53, leaving but 29 plants in operation, of which it was estimated that approximately 12 operated on legal crude oil supply. On October 31 the Atlas Pipe Line Company restored the $1.00 per barrel posted price. By November 2 "hot" oil runs were estimated at but 18,000 bbl. per day, as compared with 125,000 bbl. per day but two weeks previously, while tank car shipments declined by over 75 percent. On November 2 the State of Texas was faced with a problem of Champlin and Bass, Inc., East Texas operators, paying $4,000 fine for overproducing 58,000 bbl. during eight days, and the Railroad Commission being restrained by courts from further interfering with the intrastate movement of this crude oil because the fine was ruled to be the only penalty that may be imposed by the Railroad Commission. It was proposed that a new law be passed by the state legislature imposing a fine of 50 cents per barrel on all illegally produced oil, though it is still considered questionable whether the district courts have power to enforce such mandatory orders, as it exercised in the Champlin-Bass case, against the Railroad Commission. On November 10 the gasoline purchasing pool of some twenty major companies was ready to resume buying excess gasoline in East Texas field at 5 cents a gallon, but subsequently temporarily postponed the practice. On November 12 the Texas Railroad Commission signed an order requiring tenders for all intrastate shipments by trucks of gasoline and kerosene out of East Texas field, to be effective November 26.

Congressional Committee

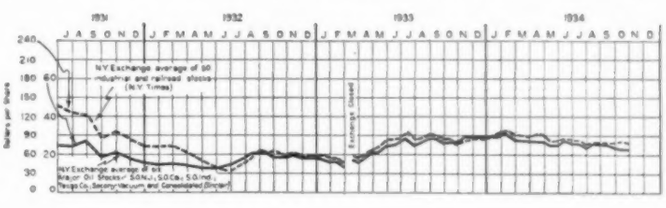
The Committee investigating the oil industry, headed by William P. Cole, Jr., Maryland, held hearings in Oklahoma City November 12 to 14, was due in Dallas from November 16 to 23, and will subsequently hold hearings in California from November 27 to December 1.

Wirt Franklin, President of the Independent Petroleum Association of America, stated that the Association was in favor of (1) limitation of imports of crude and refined products to 4.51 percent of the domestic production; (2)

U. S. drilling; comparison of oil wells, dry holes, and gas wells.



Six major oil stocks in relation to 50 industrial stocks on the New York Stock Exchange.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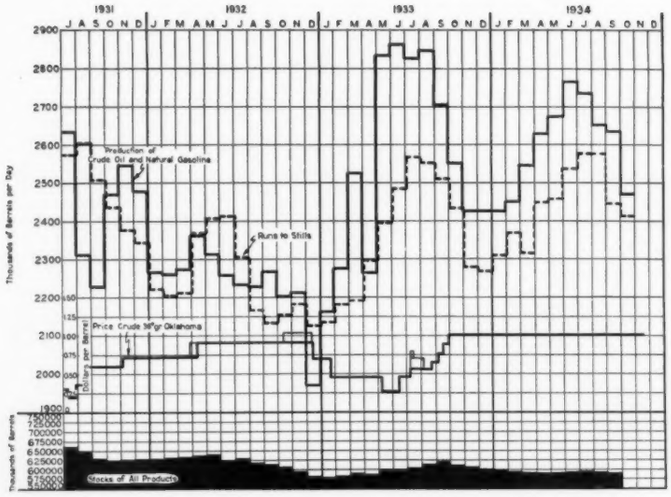
N.Y. Exchange average of 50 industrial and railroad stocks (N.Y. Times)
Exchange Closed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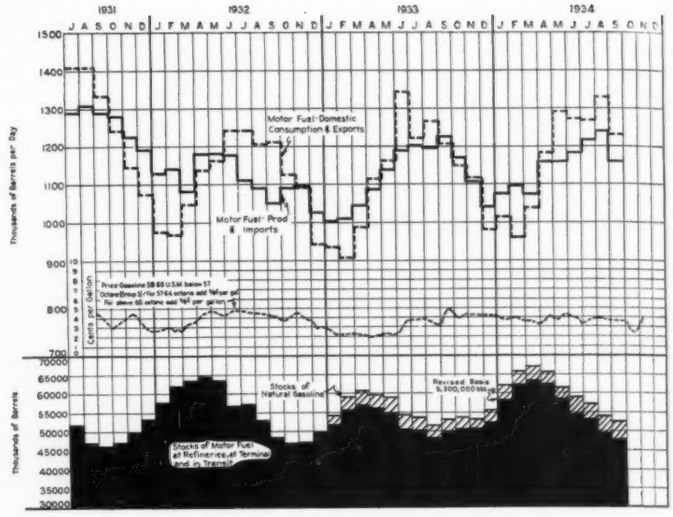
Thousands of Barrels per Day
Production of Crude Oil and Natural Gasoline
Runs to Stills
Price Crude 38° gr Oklahoma
Dollars per Barrel
Stocks of All Products
Thousands of Barrels

U. S. production, runs to stills and price of crude oil in relation to stocks of all petroleum products.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Thousands of Barrels per Day
Motor Fuel: Domestic Consumption & Exports
Motor Fuel: Prod & Imports
Cents per Gallon
Stocks of Natural Gasoline
Revised Base 6,900,000 bbls.
Stocks of Motor Fuel at Refineries, at Terminals and in Transit
Thousands of Barrels

U. S. consumption and exports, production, imports and prices of motor fuel in relation to motor fuel stocks.

federal fixation of production to meet consumptive demand and allocation of quotas to states; the states to distribute the quotas to their own pools; (3) limitation of withdrawals from storage on a reasonable basis; (4) a planned orderly development of new pools; (5) provision of adequate penalties for violations; and, (6) creation of a federal agency of either five or seven members to administer the law.

E. W. Marland, Governor-elect of Oklahoma, opposed any federal legislation designed to regulate production within states, but favored federal allowables to be assigned to each oil producing state, inter-state compacts and congressional sanction of such inter-state agreements. Mr. Marland favored restriction of imports, but his view was more constructive than Mr. Franklin's, the Governor-elect stating that he realized the great importance of the development of oil reserves in South America for which "the United States is a natural market." Governor-elect James Allred of Texas is known to be in sympathy with the views of Mr. Marland, and is definitely opposed to federal production control within individual states.

Frank Phillips, president of the Phillips Petroleum Company, came out definitely for direct governmental regulations similar to federal control of banks and railroads, stating in fact: "After sitting in with leaders of the oil industry for more than 10 years, considering the ills and abuses of the industry, I am fully convinced that we are wholly incompetent to solve our own problems by voluntary agreements or under existing agencies. Price cutting, chiseling, and unfair trade practices are more prevalent today than at any other time during my career of 30 years in this business. Agreements mean nothing. Some of those who are most active in promoting these agreements are violators."

It is not likely that Congress will pass any rigid laws regulating the oil industry as a whole, although it may evolve a law for conservation of national petroleum resources, mild at first, perhaps much more rigid in the following years when, and if, domestic crude oil reserves will become more clearly limited.

The state compacts appear unnecessary. First, such compacts would necessarily be regional because, for instance, California or Michigan would not gain anything by joining Mid-Continent oil producing states; second, a federal agency allocating production of petroleum products on the basis of respective markets has been found to be workable and a fair foundation for proration within states; and third, federal government may in any emergency, such as East Texas, restrict interstate shipments from areas of disturbance.

Effect of Federal Proration Orders in Principal Producing States

	Sept. 1933 to Oct. 1934 Cumulative Overproduction		Oct. 1934 Overproduct'n	Nov. 1934 Federal Daily Quota	Daily Average Production for week ending	
	bbl.	% of total	bbl.	bbl.	Nov. 3 bbl.	Nov. 10 bbl.
Texas	32,027,000	58.6	3,370,000	957,300	968,500	978,500
Oklahoma	10,478,000	19.1	*	459,300	400,500	459,000
California	6,031,000	11.0	300,000	462,000	445,000	489,500
Kansas	2,021,000	3.7	**	125,000	120,000	120,500
United States	56,663,000	100.0	4,360,000	2,340,300	2,294,500	2,410,000

* Oklahoma underproduced 30,000 bbl. during October.
** Kansas underproduced 50,000 bbl. during October.

Exports Steady

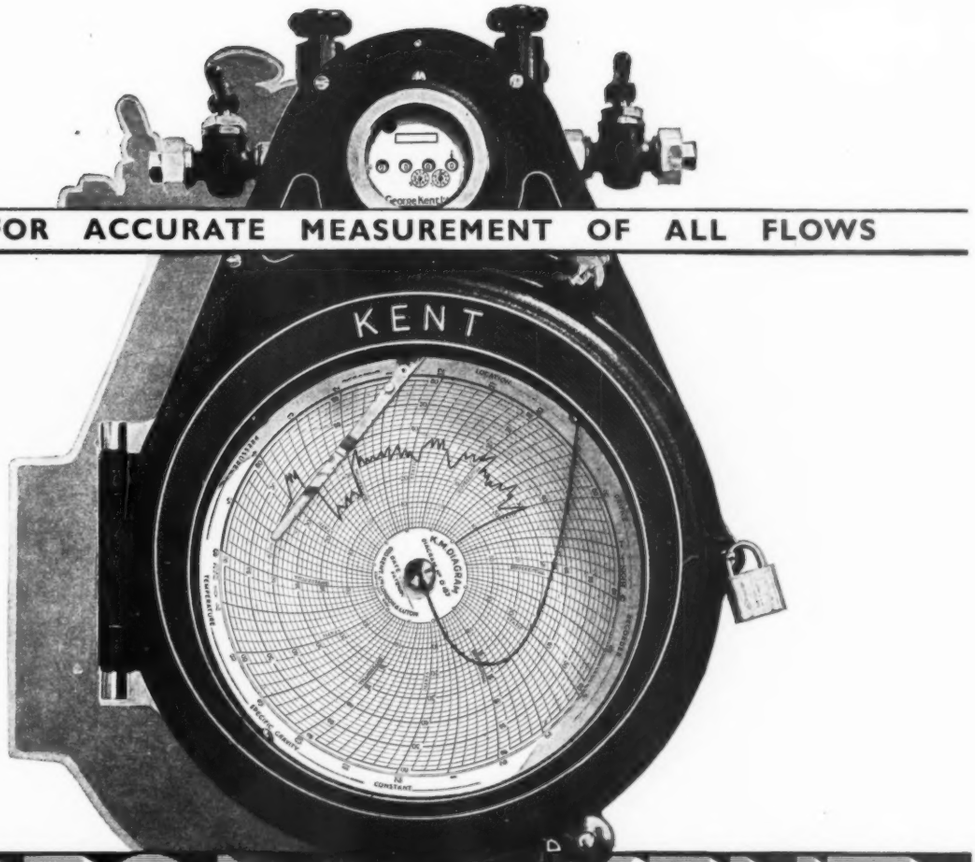
DURING September, 1934, total gross imports of all petroleum products into the United States increased slightly to 3,847,000 bbl., 128,300 bbl. per day, as compared with 3,561,000 bbl., 115,000 bbl. per day, imported during the preceding month. The above figures are for total imports including crude oil imported in bond for refining and re-export, and fuel oil for supply of vessels in foreign trade. Of this total 593,004 bbl., 19,766 bbl. per day, consisted of refined petroleum imported in bond for re-export or for bunkering ships in foreign trade. Hence petroleum and products imported during September for domestic consumption amounted to 108,534 bbl.

Exports of all petroleum products, including motor fuel, in September, 1934, remained virtually unchanged at 9,851,000 bbl., 328,000 bbl. per day, as compared with 9,640,000 bbl., 311,000 bbl. per day, shipped during August, 1934; and were 16.88 percent above total exports in September of 1933. Exports of crude oil from the United States increased to 4,068,000 bbl. in September, 1934, as compared with 3,696,000 bbl. exported in the preceding month; and 3,182,000 bbl. shipped during September of 1933. Therefore, in September of 1934 crude oil constituted 41.30 percent of the total exports of all petroleum products.

The curtailment of "hot" oil production in the East Texas field late in October by federal officials, if sustained in courts, will tend to reduce the exports of crude oil and gasoline which have been in part derived from the East Texas "hot" oil selling considerably under the market.

(Continued on page 472)

FOR ACCURATE MEASUREMENT OF ALL FLOWS



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Crude Production Reduced

CRUDE oil and natural gasoline production during October, 1934, averaged about 2,571,000 bbl. per day, 61,000 bbl. per day below the preceding month when the average production was 2,632,000 bbl. per day; and 16,000 bbl. per day above the crude oil and natural gasoline production in October of 1933. The October, 1934, average crude oil production, therefore, exceeded the federal allowable by 145,200 bbl. per day, though by the end of the month curtailment became more effective and in the week ending November 3, crude oil production averaged but 2,294,500 bbl. per day, or some 30,000 bbl. per day below the average daily quota for October. Natural gasoline production in the United States approximates currently 100,000 bbl. per day, and is not included in the federal allowables.

During October, East Texas field accounted for 77 percent of national overproduction, while Oklahoma and Kansas both fell under their allowables. In Oklahoma the great decline in the potentials of the Wilcox sand wells in Oklahoma City field was probably the principal cause of production within quota, as already suggested in the preceding issue of WORLD PETROLEUM.

Total stocks of all oils decreased by 2,552,000 bbl. during September, 1934, to a total of 587,167,000 bbl., indicating a daily gross decline in stocks of 85,000 bbl.

The crude oil runs to stills during October, 1934, averaged around 2,400,000 bbl. per day, 46,000 bbl. under September, 1934, and 171,000 bbl. under August, 1934, runs, indicating considerable improvement in the refinery situation.

Motor Fuel Demand Weakens

INDICATED domestic demand for motor fuel during September, 1934, averaged 1,166,000 bbl. per day, a decrease of 7.17 percent below the daily average during August, 1934, when 1,256,000 bbl. per day were consumed; it was only 13,000 bbl. per day above the domestic motor fuel consumption in September of 1933, an increase of 1.13 percent; 34,300 bbl. per day above the domestic motor fuel consumption in September of 1932, an increase of 3.03 percent; but 37,200 bbl. per day below the domestic motor fuel consumption in September of 1931, the peak year, a decline of 3.06 percent. Thus while the current domestic motor fuel consumption continued to exceed the domestic demand in the corresponding months of 1933 and 1932, the rate of increase recorded a sharp drop from around 7 percent for the first eight months of 1934, as compared with the same period of 1933, to 1.13 percent for the month of September of 1934 as compared with September of 1933. The drastic declines in motor fuel retail prices which took place late in September, October, and in early November throughout the United States, with the exception of the Pacific Coast, are expected to be reflected in increased domestic consumption of motor fuel, possibly carrying the demand above 1931 volume.

The NEW YORK TIMES weekly combined business index remained stationary during October at around 75–76 level, and unchanged

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from November 1, 1933. The index stood at 69 on November 1, 1932, and at 77 on November 1, 1931. The best that can be said about the business activity in the United States at this time is that it is fairly steady. Unfavorable factors suggested in the September issue of WORLD PETROLEUM continue to retard the recovery; very large federal expenditures resulting in unbalanced budget and the consequent fear of further inflationary measures being principally responsible for stagnation in heavy industries. Offsetting slow activity in basic industries is the improvement in retail trade of consumption goods which may reach the proportions of a small boom, and which again is caused in part by the fear of inflation.

The daily rate of exports of motor fuel averaged 59,000 bbl. in September, 1934, 15.71 percent below the exports in preceding months; 5.45 percent under the motor fuel exports in September of 1933; 35.27 percent under the exports in September of 1932; and 47.30 percent under the motor fuel exports in September of 1931.

Total daily demand for motor fuel in September, 1934, therefore, was 1,225,000 bbl., a very slight increase of 0.79 percent as compared with the total daily demand in September of 1933; but 0.17 percent above total daily demand in September of 1932; and 6.85 percent under total demand in September of 1931, the year in which motor fuel demand was at its peak.

On October 1, 1934, motor fuel stocks at refineries, plants, terminals and in transit amounted to 52,542,000 bbl., a decline of 1,800,000 bbl. as compared with stocks on hand on September 1, 1934, indicating that during September, motor fuel demand exceeded supply by 60,000 bbl. per day.

Refinery Prices Recover

DURING the past month the refinery gasoline quotations in the Mid-Continent district recovered sharply after the federal tender board began its operation at the end of October, but retail gasoline prices throughout the United States, Pacific Coast excepted, were upset to such an extent that extremely low quotations prevailed until this writing, November 15. The price wars, the various moves and counter-moves by major oil companies and by independent oil marketers, resulted in almost daily changes in service station prices along the Atlantic Coast, and only slightly steadier markets prevailed in the Mid-Continent and Great Lakes districts. Some of the Atlantic Coast states continued to be affected most by the price wars with gasoline selling as low as 7½ cents per gallon in New Jersey, at 12½ cents in northern New York, at 11 cents in Philadelphia, at 12 cents in Washington, D. C., at 11 cents in Trenton, N. J., and at equally low prices in many other communities. In St. Louis five price reductions in succession brought the regular grade motor fuel to 10½ cents per gallon, including taxes. Some of the very rapid changes occurred, for instance, in Houston, Texas, where prices declined 5 cents a gallon to 9 cents per gallon at service stations, including all taxes, on October 26; were advanced by November 1 to 18 cents per gallon; dropped to 16 cents per gallon by November 7; and to 15 cents per gallon by November 11. Similarly, in Buffalo and other points of northern New York, prices were advanced 4½ cents per gallon by major oil companies, but the advance was cancelled on November 9 when prices were again cut 4 cents per gallon.

While the gasoline price wars on the East Coast and elsewhere in the United States were at first caused by the large overproduction of "hot" oil in the East Texas field, the gasoline from which found its way to the Atlantic Coast, they were extended because of the fundamental disagreements between major oil companies and independent dealers, disagreements which it has not been found possible as yet to settle. The motor fuel is distributed in retail through three channels: (1) service stations owned and operated by major companies; (2) service stations owned by independent dealers purchasing their motor fuel from major oil companies; and (3) by service stations operated by independent dealers purchasing their supplies from independent refiners and selling the so-called unbranded gasoline. The independent dealers purchasing from major oil companies objected to the proposed reduction of the dealer discounts from 4 cents to 3½ cents per gallon for the two upper grades of gasoline, in the case of dealers handling only one company's products, and to 3 cents per gallon discount to "split" dealers handling products of several companies; and from 3 cents to 2½ cents per gallon for the third grade product, with the major companies apparently decided upon the reduction. The independent dealers selling unbranded gasoline present a much more difficult problem because the divergence of views on the differential between branded and unbranded gasoline is quite radical, and all efforts of compromise so far have been unavailing. The major oil companies are willing to concede ½ cent per gallon differential in favor of unbranded gasolines, 0.7 cent per gallon as the limit, while independent dealers claim 1½ cents as the possible minimum and many of them desire as much as 2 cents per gallon. It has been rumored that the major oil companies may agree to 1 cent differential and that they are considering the elimination altogether of the third grade product, but both of these suggestions are supported by so few companies that their adoption is quite unlikely.

The posted crude oil prices, which were cut by four small oil companies between October 20 and 25 from $1.00 to about 60 cents per barrel, were fully restored by November 6, and not a single major company followed the cuts while they were in effect. On November 6, however, the crude oil prices were cut in the Pennsylvania oil field 25 cents per barrel, the Bradford grade to $2.30, and by Eureka Pipe Line to $1.92.

Tank wagon/service station motor fuel prices per gallon, regular grade, including all taxes, in representative districts in the middle of November were: 16.0/17.0 cents in metropolitan New York (7.4/9.9 cents in Newark, N. J.); 15.0/16.0 cents in Boston, Mass; 13.0/15.0 cents in Providence, R. I.; 12.8/12.8 cents in Chicago; 15.5/17.5 cents in Ohio; 16.5/18.5 cents and 15.5/17.5 cents in San Francisco and Los Angeles respectively; 16.0/18.0 cents

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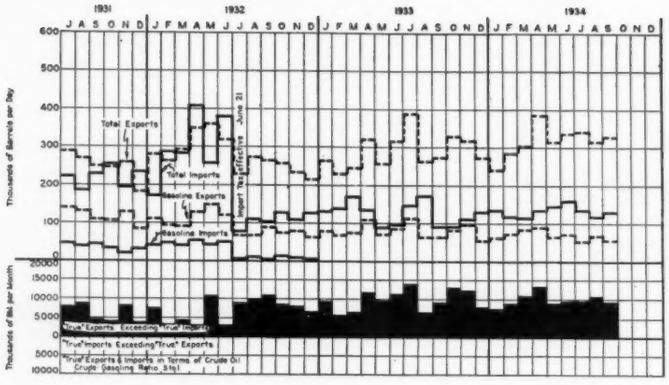
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Thousands of Barrels per Day
Total Exports
Total Imports
Gasoline Exports
Gasoline Imports
June 21
Import Tax Effective
Thousands of Bbl. per Month
"True" Exports Exceeding "True" Imports
"True" Imports Exceeding "True" Exports
"True" Exports & Imports in Terms of Crude Oil
Crude-Gasoline Ratio, 3 to 1

Total U. S. imports and exports and gasoline imports and exports in relation to true exports exceeding true imports.

in Oklahoma; 12.7/12.5 cents in St. Louis (14.1/11.0 cents in East St. Louis); and 24.0/27.0 cents in Montreal, Canada; all with a 2-cent differential for premium grade.

Refinery gasoline quotations in the Mid-Continent district recovered promptly after the federal tender board began its operation in the East Texas field on October 25. Advances of as much as 2 cents per gallon, to 4¼ cents from 2¼ cents per gallon, were recorded by November 15. Refinery gasoline was quoted on November 15 in a fairly strong market at 4⅛ to 4¼ cents per gallon for 58–60 U.S.M. grade 62.9 and below octane rating in Group 3, Oklahoma market, 63.0–70.9 octane rating, U.S.M., brought 4⅝ to 4⅞ cents per gallon, and 71 and above octane rating, U.S.M., was quoted at 4⅞ to 5⅛ cents per gallon. In the East Texas field two sets of prices were prevalent as a direct result of the operations of the federal tender board: for shipping in interstate commerce third grade gasoline was quoted at around 4 cents per gallon, while for shipping in intrastate commerce the price was as low as 2¾ cents per gallon. On the East Coast, at Bayonne, U.S.M. grade 60.0–64.9 octane rating, was quoted stronger at 5½ cents per gallon (3.25 cents gold*). Gulf Coast prices for export on November 15 were 3⅞ cents per gallon (2.27 cents gold*) for 58–60 U.S.M. grade.

Natural gasoline quotations remained steady during the past month, and on November 15 grade 26–70 was quoted at 3.0 cents per gallon (1.77 cents gold*) in Oklahoma; at 2⅝ to 2¾ cents per gallon (1.62 cents gold*) in northern Texas; and at 3⅜ cents per gallon (1.99 cents gold*) in north Louisiana.

Kerosene prices strengthened appreciably during the past month and by November 15 grade 41–43 w.w. was quoted at 3¼ to 3½ cents per gallon in group 3, Oklahoma market; and at 5 to 5¼ cents per gallon (3.03 cents gold*) on the Eastern Coast at Bayonne; Gulf Coast prices for export steadied somewhat to 3⅞ cents per gallon (2.29 cents gold*) for 41–43 p.w. grade.

The outlook for the maintenance of the current crude oil quotations and for the improvement in the refinery and retail motor fuel prices remains quite indefinite, even though temporary improvement has been effected in the East Texas field. If the federal government and the state agencies will continue to be able to restrict East Texas production to its allowable of some 410,000 barrels per day, crude oil prices will be sustained through the balance of the winter and the refinery gasoline quotations should improve to around 5 cents per gallon, which development will necessarily correct the price debacles in Atlantic Coast states, and elsewhere, by the simple process of drying up the supply of cheap motor fuel from the independent refiners; the question of discount and differential policies will, in this case, be solved quickly. If, however, East Texas "hot" oil production will again be permitted into the interstate commerce, which is admittedly very unlikely, radical price reductions may be anticipated in crude oil and all its products, and chaotic conditions in the retail markets will continue to prevail.

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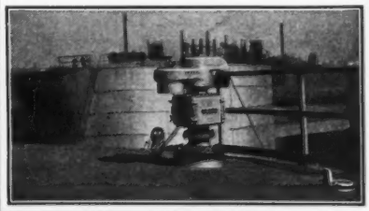

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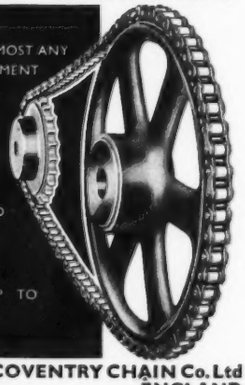

The RENOLD & COVENTRY CHAIN Co. Ltd
MANCHESTER ENGLAND
• AGENTS THROUGHOUT THE WORLD

You *know* this valve is stronger and safer and can "take it" in the hardest kind of Xmas Tree and pipe line service because it is

DROP FORGED

by Vogt

Manufacturers of Drop Forged Steel Valves and Fittings, Oil Refinery Equipment, Water Tube Boilers, Ice Making and Refrigerating Machinery, Heat Exchangers.

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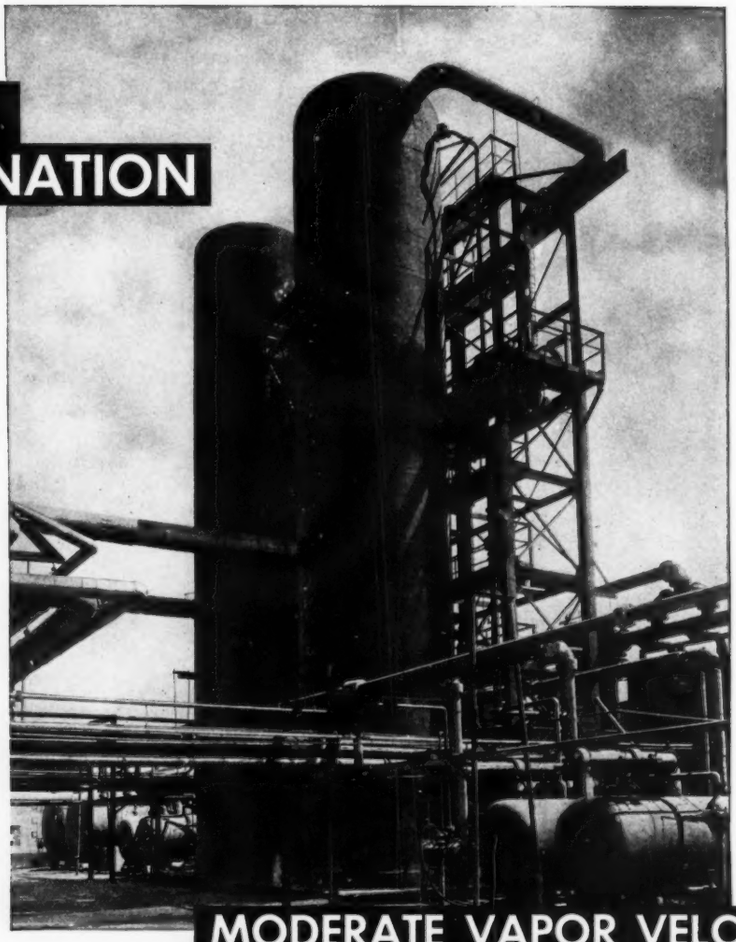
HENRY VOGT MACHINE COMPANY · Inc. LOUISVILLE KENTUCKY

ALCO FRACTIONATION



MODERATE VAPOR VELOCITY AMPLE RESERVE CAPACITY

EVER increasing numbers of refiners in this country and abroad are finding the Alco special design of fractionating equipment to be most efficient and dependable, whether it be in petroleum distillation, cracking, rerunning, stabilization, or gas recovery.

Sharp fractionation (often requiring full gaps between cuts) is assured by the Alco design, which provides for moderate vapor velocity with ample reserve capacity.

ALCO PRODUCTS INC.
DIVISION OF
AMERICAN LOCOMOTIVE CO.

220 EAST 42nd ST., NEW YORK, N. Y.

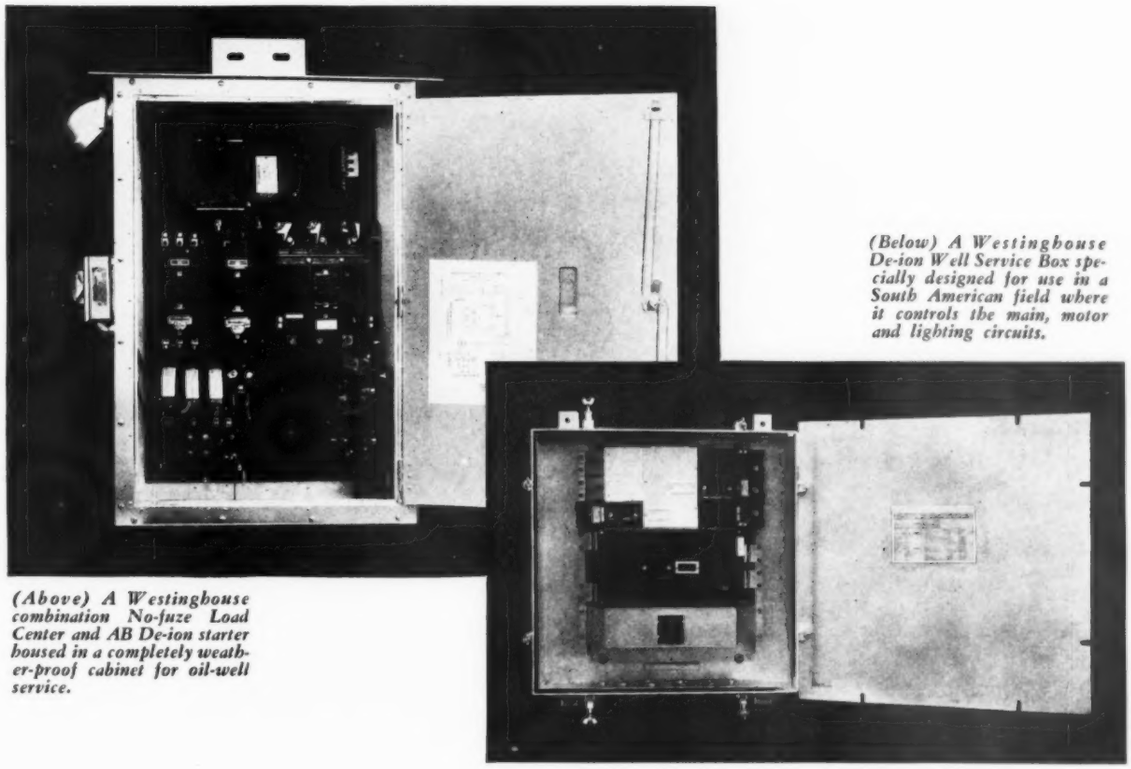
CABLE ADDRESS: "ALPRODUCTS"—NEW YORK
"ALPRODUCTS"—LONDON

LONDON OFFICE: 25 VICTORIA STREET, LONDON, S. W.I., ENGLAND

LICENSING AGENTS *for Gyro Vapor Phase Cracking, Gray Process Clay Treating, and Stratford Acid Treating System.*

ENGINEERING, DESIGN, FABRICATION, ERECTION *of Gyro Vapor Phase Cracking Plants, Atmospheric and Vacuum Distillation Units, Tube Stills, Fractionating Towers, Treating Plants, Gasoline Absorption, Stabilizing and Debutanizing Plants, Fluor Cooling Towers, and all types of Heat Exchange Equipment.*

World Petroleum, Vol. 5, No. 12, December, 1934. Entered as Second Class Matter February 5, 1931, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Additional entry at the Post Office at Concord, N. H. Published Monthly by Russell Palmer, 56 West 45th Street, New York, N. Y. Annual subscription rate, 5 dollars (U. S. currency).



(Below) A Westinghouse De-ion Well Service Box specially designed for use in a South American field where it controls the main, motor and lighting circuits.

(Above) A Westinghouse combination No-fuze Load Center and AB De-ion starter housed in a completely weather-proof cabinet for oil-well service.

NO-FUZE DE-ION BREAKERS

give Full Protection for Every Production and Refinery Circuit

Advantages of NO-FUZE Breakers

1. Time lag prevents unnecessary tripping on slight, momentary overload.

2. Can be reclosed by anyone as easily as a switch. Nothing to replace or renew.

3. Cannot be held closed against an abnormal overload or short circuit.

4. Cannot be blocked to prevent opening the circuit.

5. Rating cannot be changed by unauthorized persons.

6. Eliminates fuses and their replacement.

Modern practice for the control of all circuits at the well and in the refinery calls for the use of Westinghouse No-fuze De-ion Breakers. Available in all ratings from 15 to 600 amperes, De-ion Breakers make possible a compact centralized load control for the main circuit, motor circuit, lighting circuit and all auxiliary circuits. They can be mounted and housed entirely according to your specifications —in weather-proof or explosion-proof cabinets, with internally or externally operated breakers—exactly to meet your requirements.

Westinghouse has supplied No-fuze Load Centers to most of the important fields throughout the world and because they are designed especially for—not merely adapted to—the needs of the oil industry, operators everywhere have endorsed them heartily.

WESTINGHOUSE ELECTRIC INTERNATIONAL COMPANY
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INTERNATIONAL PETROLEUM COMPANY

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Producers, Refiners, Distributors, and Marketers of Petroleum and Petroleum Products in the Republic of Peru

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THERE IS NO SUBSTITUTE FOR EXPERIENCE

It is becoming increasingly apparent that design and construction based on experience offer the surest means to long time profitable operation.

Other means may offer a low investment cost, but operating costs, maintenance and obsolescence are major items affecting the cost of the product.

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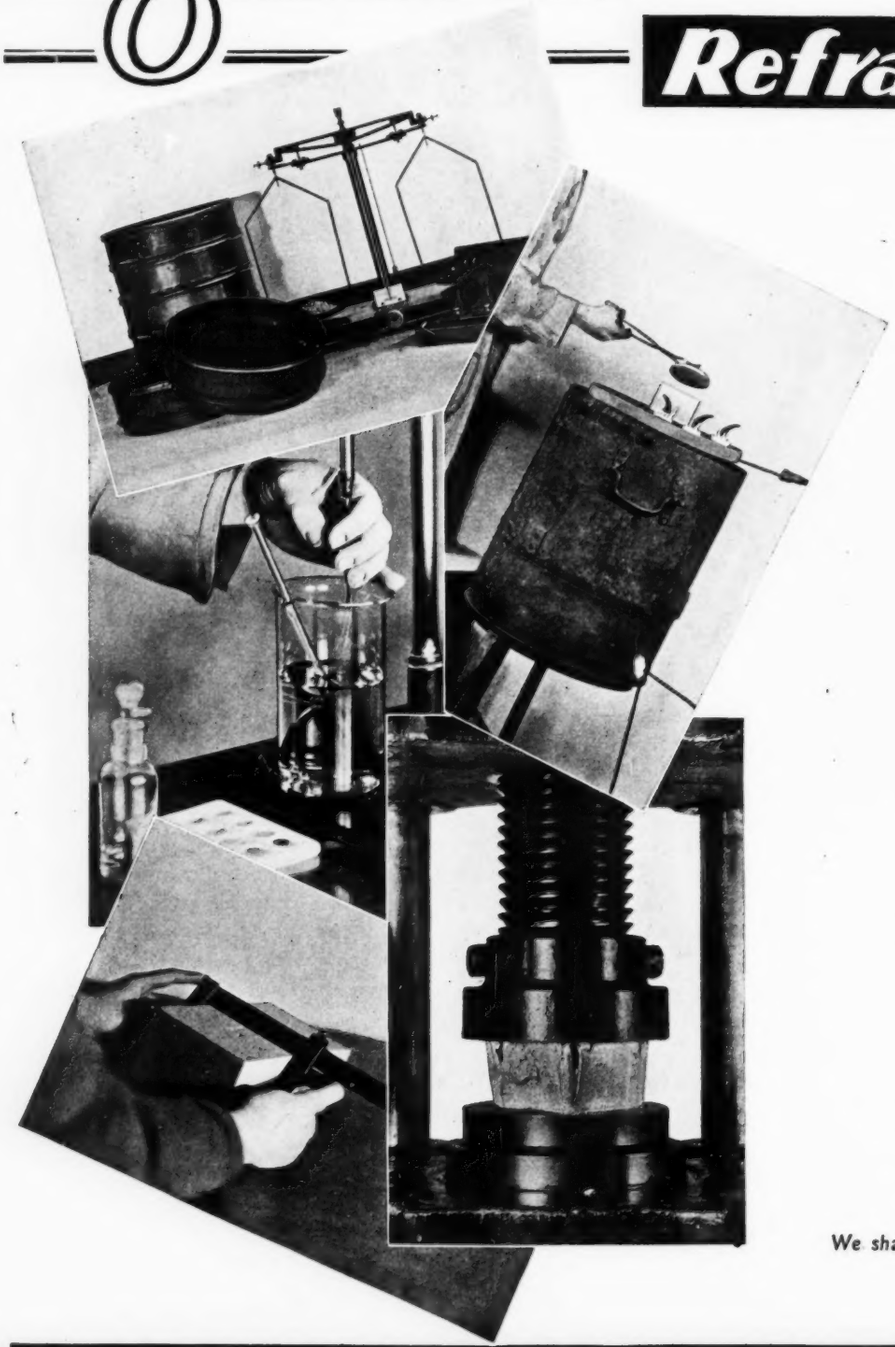
LICENSING AGENT FOR GASOLINE PRODUCTS COMPANY, INC. Licenses granted under United States and Foreign Patents for: Cross · de Florez · Holmes-Manley · Tube and Tank Cracking Processes and Combination Cracking Units · European Representatives: Compagnie Technique des Petroles · 134 Boulevard Haussmann · Paris, France.

KELLOGG PRODUCTS INCLUDE: Cross, Holmes-Manley, de Florez and Tube and Tank Cracking Units, Absorption Plants and Pipe Stills, de Florez Temperature Control. Pressure Vessels for the Power, Refinery and Chemical Industries. Power Plant and Industrial Piping. Pacific Hot Oil Pumps, Radial Brick Chimneys. Plastic Refractories.

High Grade Refractories



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can be obtained only from bricks which have been developed to meet the conditions obtaining in modern industrial furnaces — bricks which are maintained at a consistently high standard by technical control.

GRADING,
CHEMICAL ANALYSIS,
REFRACTORINESS,
STRENGTH,
SIZE,

are but a few of the many factors in the evolution of a high grade brick.

BRANDS

NETTLE - - - -	43/44%	Alumina
THISTLE - - - -	37/38%	„
STEIN GLASGOW-	34/36%	„
STEIN - - - - - -	33/35%	„
J. G. S. & CO. -	84/86%	Silica
BLUEBELL - - -	95%	„

We shall be glad to have your enquiries.

John G. Stein & Co. Ltd.

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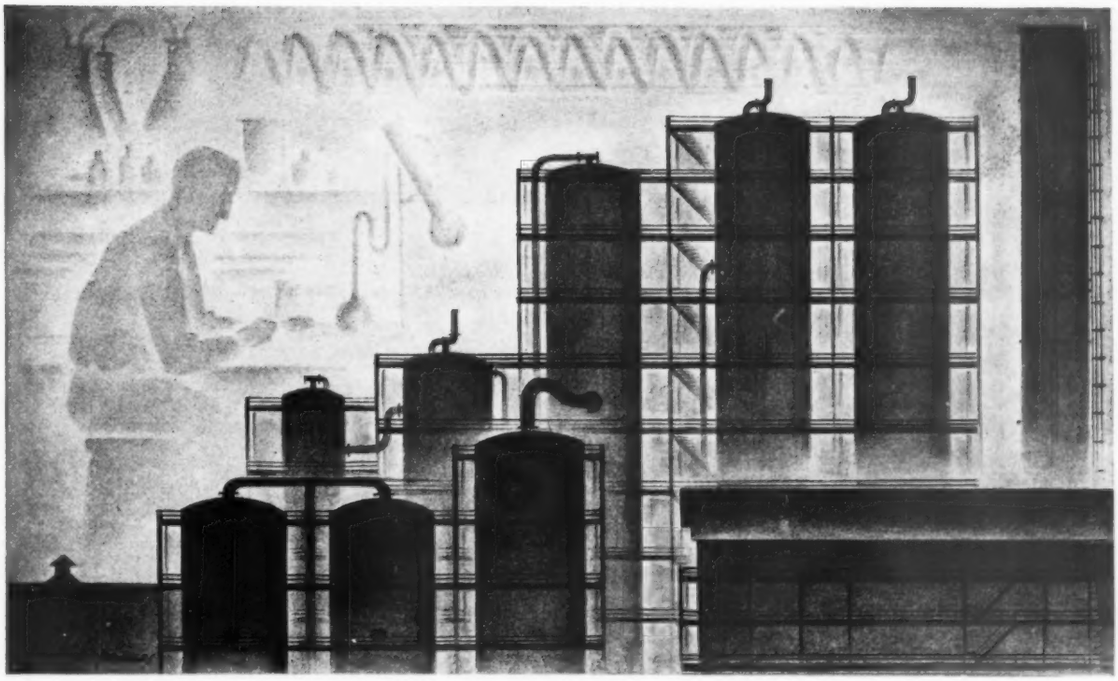
The Largest Makers in the British Empire

Our Technical Service is at your disposal



INTEGRATED PROGRESS IS THE RESULT OF RESEARCH

LICENSES granted under United States and Foreign Patents for: Cross • de Florez • Holmes-Manley • Tube and Tank Cracking Processes and Combination Cracking Units.

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The broad licensing rights of Gasoline Products Company offer refiners the benefits of integrated progress. Through this organization, the engineering developments of several major refineries are coordinated. Laboratory research is conducted under the supervision of research workers and engineers familiar with practical refining methods. The cumulative experience and operating data of refineries processing various crudes in many parts of the world are also available.

Through this policy of integrated progress, combination units are designed incorporating one or more of the outstanding features of several processes. These units assure the refiner that the cracking equipment he installs will be suited to his particular requirements.

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GASOLINE PRODUCTS COMPANY

INCORPORATED

GASOLINE PRODUCTS CO INC

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THE NEW SHARPLES BARI-SOL CENTRIFUGAL DE-WAXING PROCESS ENABLES YOU TO DEWAX THE ENTIRE LUBRICATING FRACTION AND SPLIT THE DEWAXED PRODUCT TO VISCOSITY REQUIREMENTS AFTERWARD

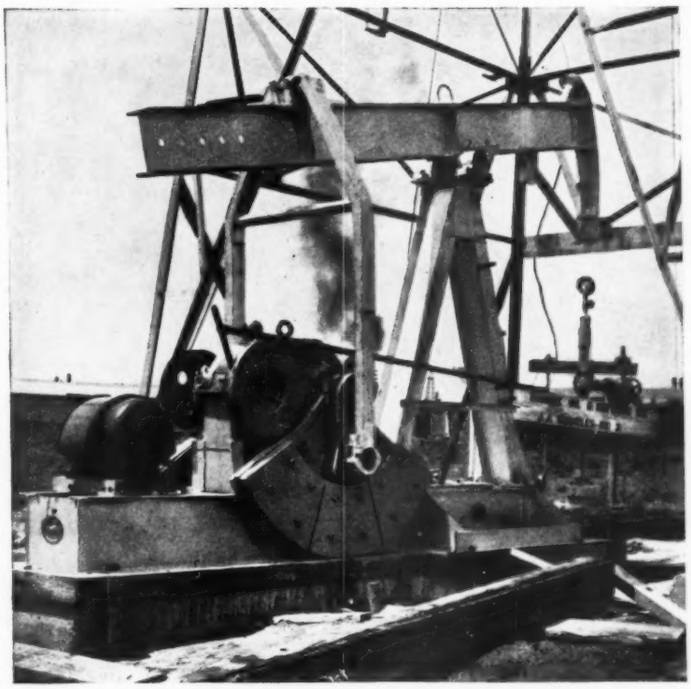
. . . . Formerly, in dewaxing centrifugally, it was necessary to produce a dewaxing stock containing waxes of an amorphous or semi-amorphous nature. Centrifugal processes were admittedly unsatisfactory for stocks containing crystalline wax. ★ The new Sharples Bari-Sol Process not only removes amorphous or semi-amorphous waxes but crystalline waxes as well. Consequently it enables the refiner to first dewax the entire lubricating fraction, containing both amorphous and crystalline waxes, and to split afterward to viscosity requirements. ★ The ability to dewax the entire lubricating fraction eliminates distillation to separate crystalline from amorphous wax, eliminates pressing to remove crystalline wax; and cuts the cost and simplifies the work of rerunning and refining regardless of the method used. The Sharples Specialty Company, 2323 Westmoreland St., Phila., Penna. FOREIGN AGENT: Z. A. Toula, 134 Boulevard Haussmann . . . Paris.

SHARPLES
CENTRIFUGAL ENGINEERS

For Economical Well-Pumping

use

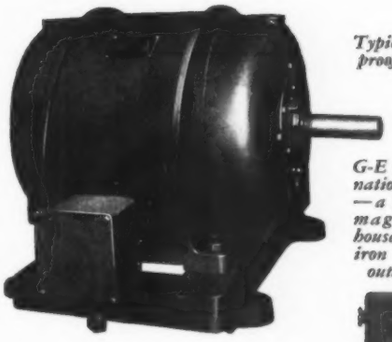
MOTORS *and* CONTROL



A typical oil well pumping unit driven by a General Electric splash-proof motor

YOU don't have to build a house for your pumping drives. Equip your pumpers with General Electric motors and control installed OUTDOORS. G-E splash-proof motors designed especially to prevent the entrance of liquids have proven in many locations their suitability for outdoor installation.

The G-E waterproof magnetic switch — perfectly matched to the splash-proof motor — is designed particularly for outdoor service. It combines a line switch and a magnetic starter, all under one cover — only one unit to install.



Typical G-E splash-proof induction motor

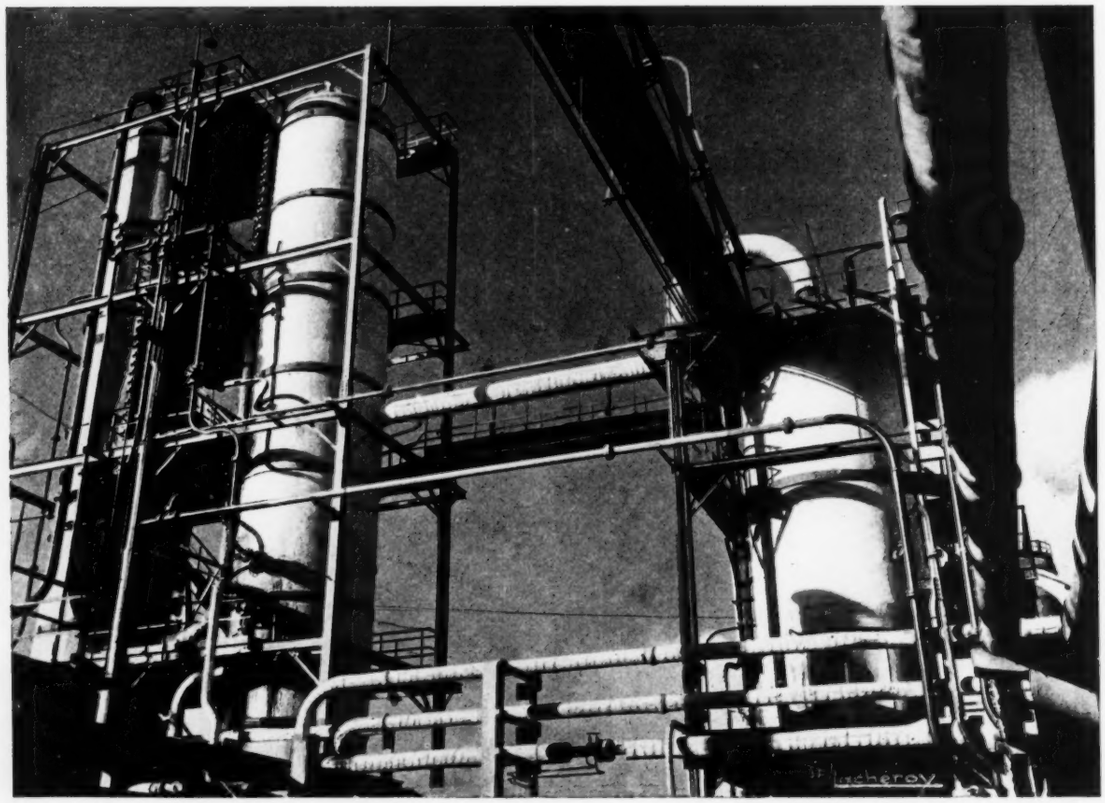
G-E waterproof combination magnetic switch — a line switch and a magnetic starter, housed in a single cast-iron case. Ideal for outdoor installation

G-E splash-proof motors and waterproof switches are representative of the line of equipment designed by General Electric for oil-field service. This line includes gear motors — available with splash-proof protection — for slow motion pumping, and explosion-proof motors for locations where inflammable gas is present. All of these drives can be obtained in double- or triple-horsepower ratings.

A representative of the International General Electric Company, Inc. — you will find them in all the principal cities of the world — will be glad to help you SAVE WITH G-E MOTORS AND CONTROL.

WP-12-34

GENERAL ELECTRIC



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OF THE

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The Standard Franco-Américaine de Raffinage Port-Jérôme Refinery is the largest and most modern Refinery in Europe.

It is now producing and supplying petroleum products of recognised "**STANDARD**" excellence in quality to the French market.

These products are distributed by l'Économique, the Bedford Petroleum Company, the Compagnie Générale des Pétroles, La Mailleraye, André Fils, Quervel.

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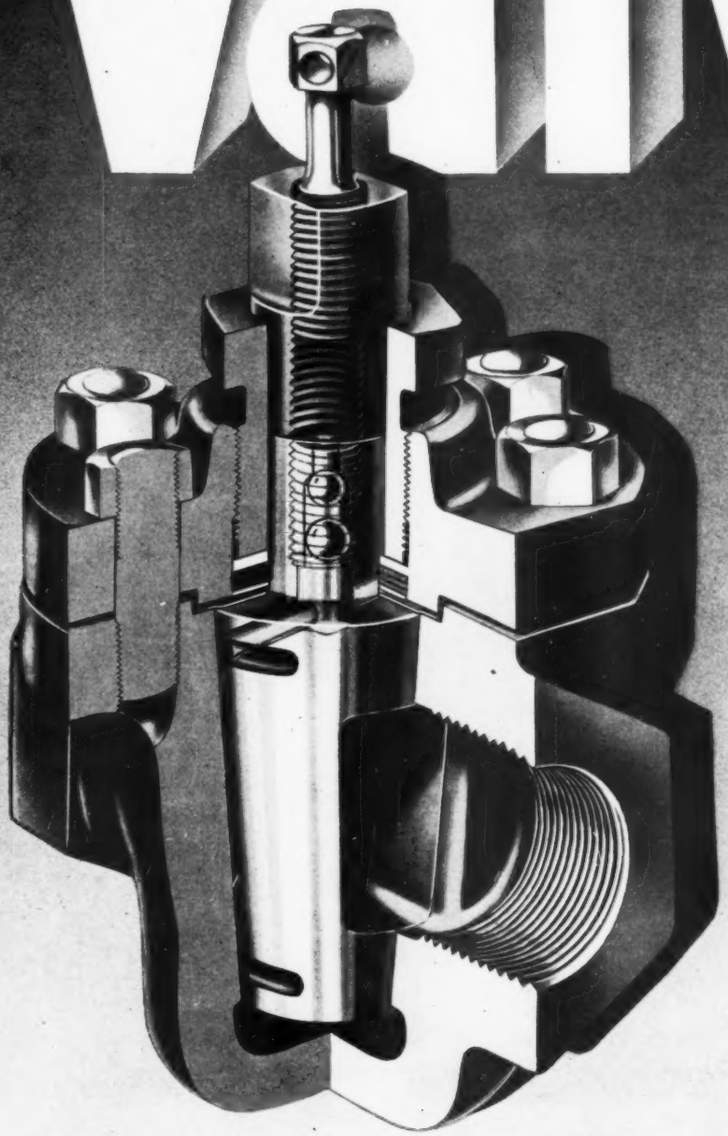
LUBRICATED PLUG

QUICK, EASY TURNING, NON-CORRODING, LEAK RESISTING

Valves



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AMERICAN *in the Western Hemisphere*

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The Pioneer Lubricated Plug Valves • Assure Positive Shutoff • Lubricant Seals Plug Against Leaking • Non-Sticking • Quick, Easy, Quarter-Turn Operation to Open or Close • Resist Corrosion • Require Less Space • Reduce Maintenance Costs In Every Division of the Petroleum Industry.

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WORLD WIDE ACCEPTANCE BY THE OIL INDUSTRY

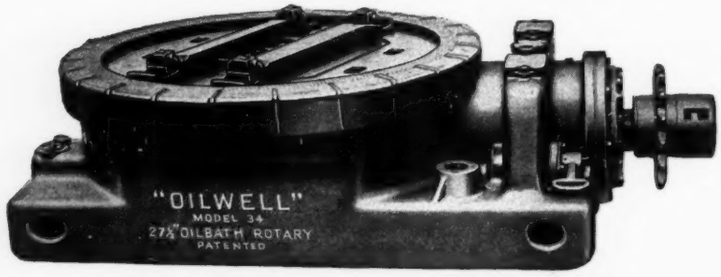
A NEW ROTARY BY "OILWELL"

CHECK THESE ADVANTAGES:

- ✓ **High Table Speeds for Faster Drilling.**
- ✓ **Greater Strength for Deep Drilling and Heavy Loads . . . Recommended Maximum Drilling Load 12,000 ft., 4½" Drill Pipe or Equivalent Load.**
- ✓ **Convenient, Safe, High Speed Operation.**
- ✓ **Compact, Heavy Reinforced Cast Steel Base, with Skids and Pinion Bearing Housing Integral.**
- ✓ **Fully Enclosed, Oil-Tight Roller Bearing Unit Pinion Shaft Assembly with Overhung Sprocket.**
- ✓ **Heavy Ball Thrust Table Bearing with Heat-Treated High Brinnell Alloy Steel Ball Races.**
- ✓ **Forged Alloy Steel, Machine Cut, Heat-Treated Gear Train.**

THE NEW "OILWELL" MODEL 34 • 27½" STRAIGHT OILBATH ROTARY

is the last word in rotary design. Its many new features for safe high speed operation will make it the choice of both drillers and operators.



"OILWELL" MODEL 34 • 27½" OILBATH ROTARY

Large capacity oil reservoir with return system, providing oilbath and splash lubrication for all bearings and gears; fully enclosed and dust proof table with strong table guard; base capacity—250 tons, recommended maximum drilling load—12,000 ft., 4½" drill pipe; table opening 27½"; maximum operating speed 250 R.P.M.

For complete information, refer to Bulletin No. 130.

"OILWELL" ROLLER DRIVE BUSHING

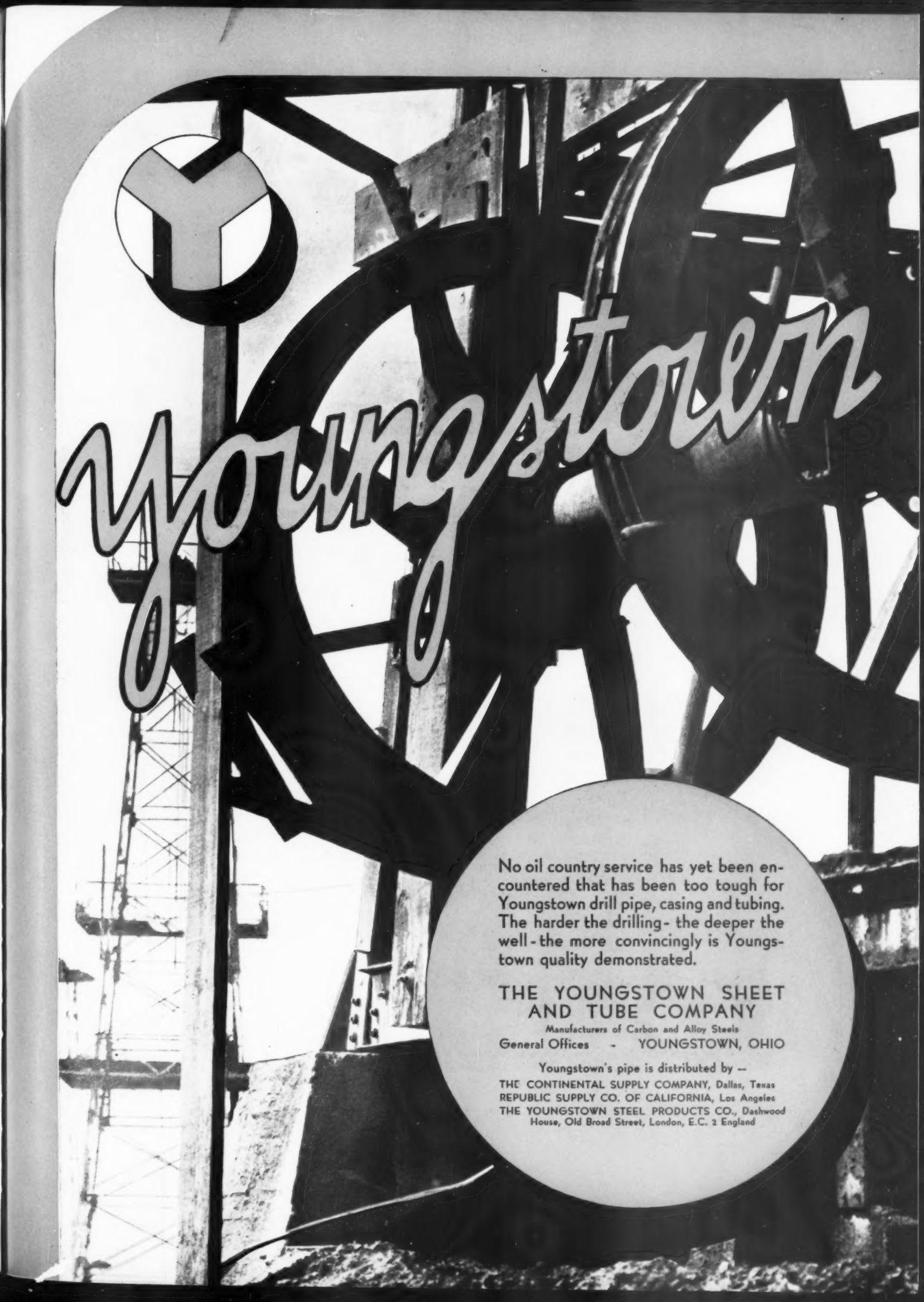
Recommended for use with "OILWELL" Rotaries to prevent binding of Grief Stem by allowing free movement through table, resulting in a steady drive and accurate control of the weight on the bit. "OILWELL" Roller Drive Bushings can be furnished for any make of Rotary. Regularly offered for 6, 5¼, 4¼ and 4" Square Grief Stems. Other sizes upon request. Ask for leaflet No. 21.

OIL WELL SUPPLY CO.
Subsidiary of United States Steel Corporation

Branch Stores in all Oil Fields

2808

"OILWELL"



No oil country service has yet been encountered that has been too tough for Youngstown drill pipe, casing and tubing. The harder the drilling - the deeper the well - the more convincingly is Youngstown quality demonstrated.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

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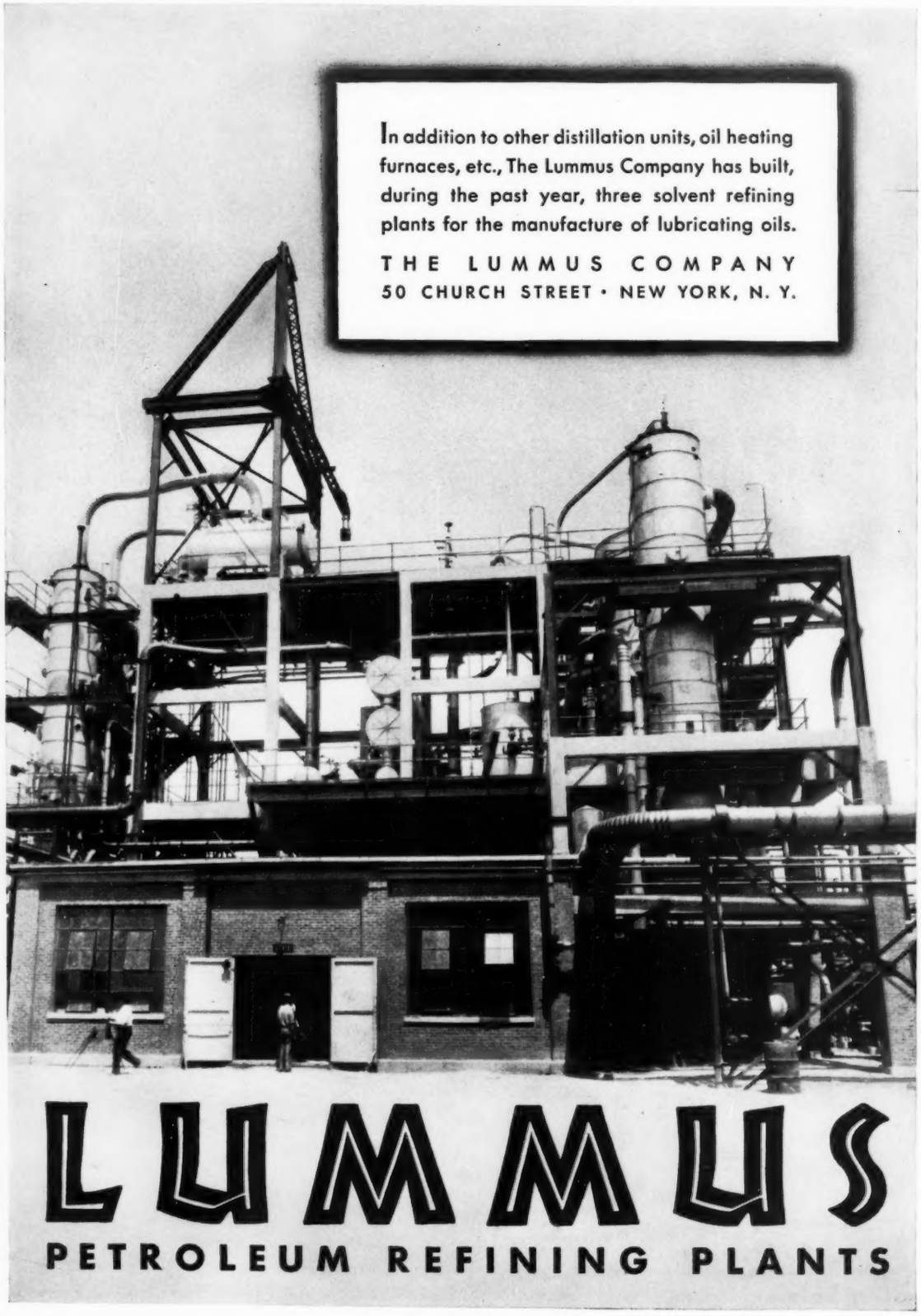
REPUBLIC SUPPLY CO. OF CALIFORNIA, Los Angeles

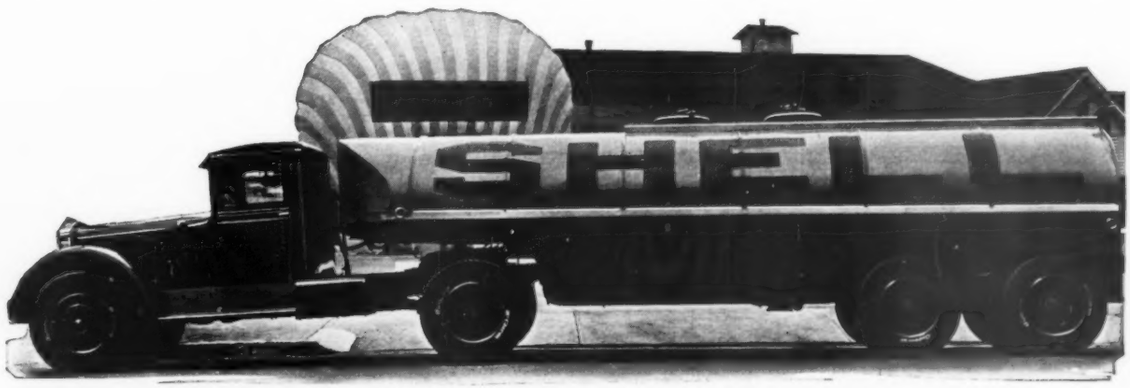
THE YOUNGSTOWN STEEL PRODUCTS CO., Dashwood House, Old Broad Street, London, E.C. 2 England


In addition to other distillation units, oil heating furnaces, etc., The Lummus Company has built, during the past year, three solvent refining plants for the manufacture of lubricating oils.
THE LUMMUS COMPANY
50 CHURCH STREET · NEW YORK, N. Y.
LUMMUS
PETROLEUM REFINING PLANTS

For Twenty Years

REO

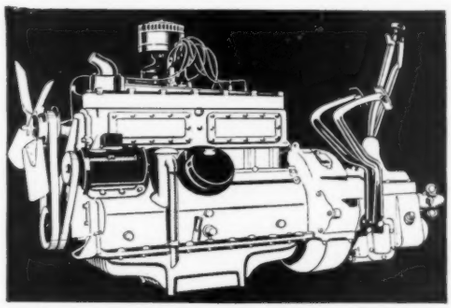
has rendered Vital Transportation Service to the World-Wide Oil Industry



During the period that has witnessed the greatest development of the World-Wide producing and distributing of Oil and Gasoline, REO has achieved foremost rank as a builder of fine trucks.

It is therefore no accident that big names of the Oil Industry are closely linked with REO Transportation.

Engineers and Purchasing Agents entrusted with making sure that oil and gasoline in required volume are, at all times, being delivered speedily, safely, and economically to every little corner of the world, have long since learned from experience that there is a REO Truck or Tractor-Trailer properly engineered for every job.



The Eight Cylinder Gold Crown Engine

Among the many outstanding features of REO Trucks, which have helped make of them a vital and profit-making necessity to Oil and Gasoline distribution are the Reo-designed, Reo-built six and eight cylinder Gold Crown engines.

No matter what the tank capacity required or equipment needed, every purchaser or user of motorized transportation will find it profitable to consult REO'S engineers.

Cable or write for literature and specific data.

REO MOTOR CAR COMPANY

LANSING MICHIGAN U. S. A.

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HADFIELDS

Special Steels for the oil industry

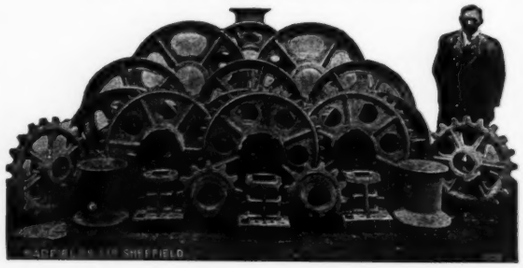
TRADE ERA MARK

MANGANESE STEEL

(of which Hadfields are the inventors and sole makers)

THE SUPREME MATERIAL

for Sprocket Wheels, Pulleys and other parts of oil well drilling machinery.



TRADE HECLA 127 MARK

STEEL

for

Fish Tail Bits for rotary drilling, core barrel cutter heads, etc.

TRADE ERA MARK

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HEAT RESISTING STEEL

For Tubes, Tube Supports, Hangers, Spacers and other parts subjected to high temperatures.

TRADE ERA 131 MARK

STEEL

For Plant and Components used at intermediate temperatures. Not subject to temper or corrosion brittleness.

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NON-CORRODING STEEL for Thermowells. Highly resistant to the attack of numerous chemical agents.

STEEL CASTINGS AND FORGINGS of all kinds.

HADFIELDS LTD. East Hecla & Hecla Works, SHEFFIELD, ENGLAND.

Area of Works, over 200 acres.

Buildings cover 61 acres.

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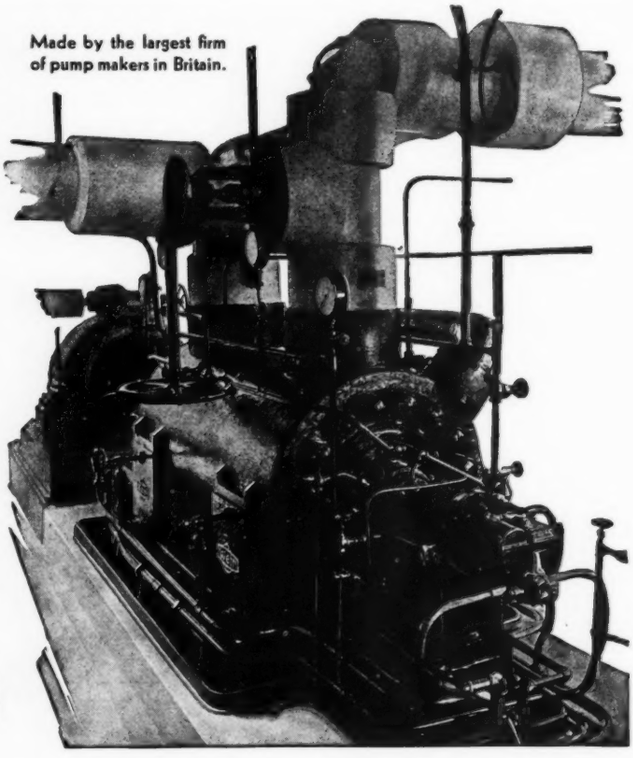
Made by the largest firm of pump makers in Britain.



For all Refinery & Pipe Line Duties

Pipe Line: Steam, Electric or Diesel drive, reciprocating and centrifugal types.

Refinery: For Hot or Cold duty, Charging, Reflux, Transfer, Residue, etc. For temperatures up to 1,000° F. and pressures up to 3,000 lb. per sq. in.

● Illustration shows Weir Centrifugal Hot Oil Pump, turbine driven, in service. 21,000 Imp. gallons per hr., at 1,250 lb. per sq. in.

Proved in operation the most advanced pump of its kind.

G. & J. WEIR LTD. CATHCART · GLASGOW

LET THE CHEMICAL COP EARN YOUR ROYALTY

IN MANY REFINERIES Universal liquid inhibitor saves enough over former treating costs to pay the royalty on a licensed cracking operation

For one refiner the chemical cop saves more than 14 cents a barrel

How much can he save you?

It will cost you nothing to find out

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TO CLAIM AND TO PROVE

are two different things. It is easy to claim for new methods and apparatus that they save costs, simplify operation, and improve quality. We claim it! The results obtained in numerous plants in long commercial operation prove it!

OUR centrifugal dewaxing method, using a heavy chlorinated solvent, requires lower dilution and less refrigerating capacity, and permits a higher throughput per centrifuge than any other similar method. Consider what this means in regard to installation and operation cost per barrel daily capacity!

Stocks containing crystalline or amorphous wax, stocks with a high or low wax content, acid refined or solvent extracted or untreated stocks — any of these can be successfully dewaxed by our method. Result: a high yield of low cold test oil at low cost.

Our continuous refining method for lubricating oil, kerosene and pressure distillate do justice to that excellent refining agent: sulphuric acid. By mechanically dispersing the acid into the oil and accurately limiting the contact time by complete centrifugal separation, the acid is fully utilized and the treatment kept under perfect control.

For obtaining a lubricating oil or a kerosene of desired colour less chemicals are required, and the refining losses are greatly reduced.

When refining P.D., the desired gum test and anti-knock properties can be obtained with less polymerisation losses and easier neutralisation.

And on top of all that: a continuous S-N Refining Plant is compact, simple, cheap to install and easy to operate.

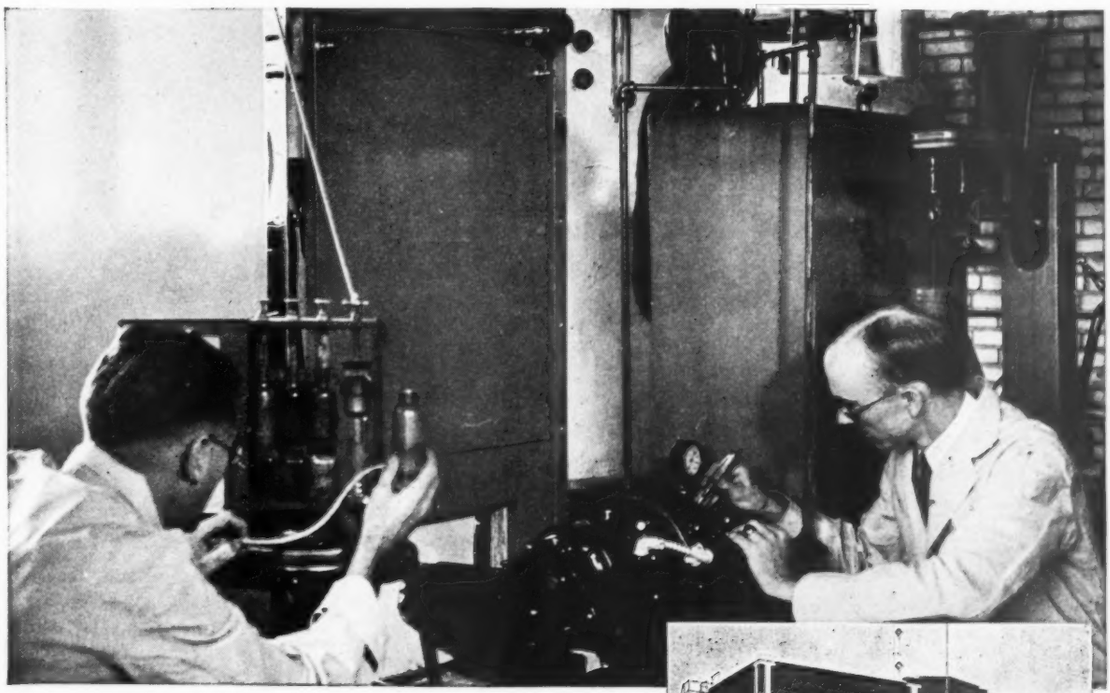
Our pilot plant is at your service for complete dewaxing and/or refining tests. Write to-day for our pamphlets No. 11594, 11699 and 11875, containing full particulars and data on S-N dewaxing and continuous refining. They will interest you!

THE SEPARATOR-NOBEL CO., LTD.

STOCKHOLM, SWEDEN

Representatives all over the world

Fuel Oil Tested for Burners in Burners
under actual operating conditions!



Because Different Types of Burners Require Different Grades of Oil

Shell Oil Burner Testing Laboratory, Sewaren, New Jersey.

WHAT CHARACTERISTICS must fuel oil have to insure satisfactory burner operation? Not just for one burner, but for *every* type of burner!

Obviously, the answer to this question was a big order . . . one that involved time and money. A testing staff. Laboratories and expensive testing equipment.

Yet Shell decided to answer this question as completely as possible. It is a Shell policy to manufacture products that *not only meet standard specifications, but every requirement of all domestic and industrial oil burners.*

Hence, at Sewaren, New Jersey, Shell built a completely equipped Oil Burner Testing Laboratory—perhaps the first of its kind in existence—for the express purposes of coöperating with oil burner manufacturers in the development of all types of fuel oils.

Here exhaustive tests are carried out on all types of burners under actual operating conditions. Consequently, Shell can determine just what characteristics a fuel oil must have to insure satisfactory operation in every type of burner.

These special tests are typical of the ceaseless effort exercised in the manufacture of all Shell products to guarantee excellence of performance beyond that insured by standard specifications.

SHELL PETROLEUM PRODUCTS

Nine strategically located Shell Refineries: Arkansas City, Kan.; Conlinga, Cal.; Dominguez, Cal.; East Chicago, Ind.; Houston, Texas; Martinez, Cal.; Norco, La.; Wilmington, Cal.; Wood River, Ill.

FIRTH-BROWN HOLLOW FORGED VESSELS

FOR CHEMICAL AND OIL CRACKING PLANTS

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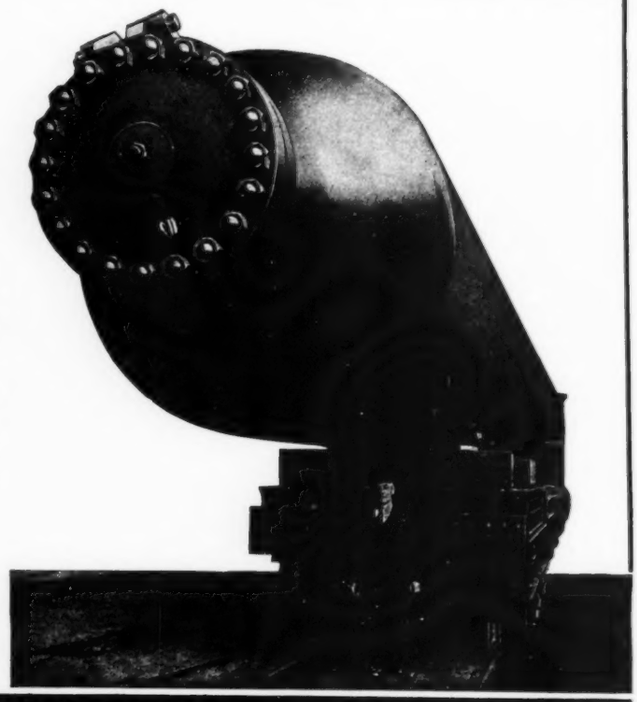

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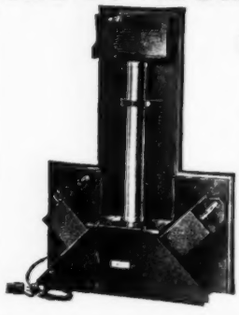

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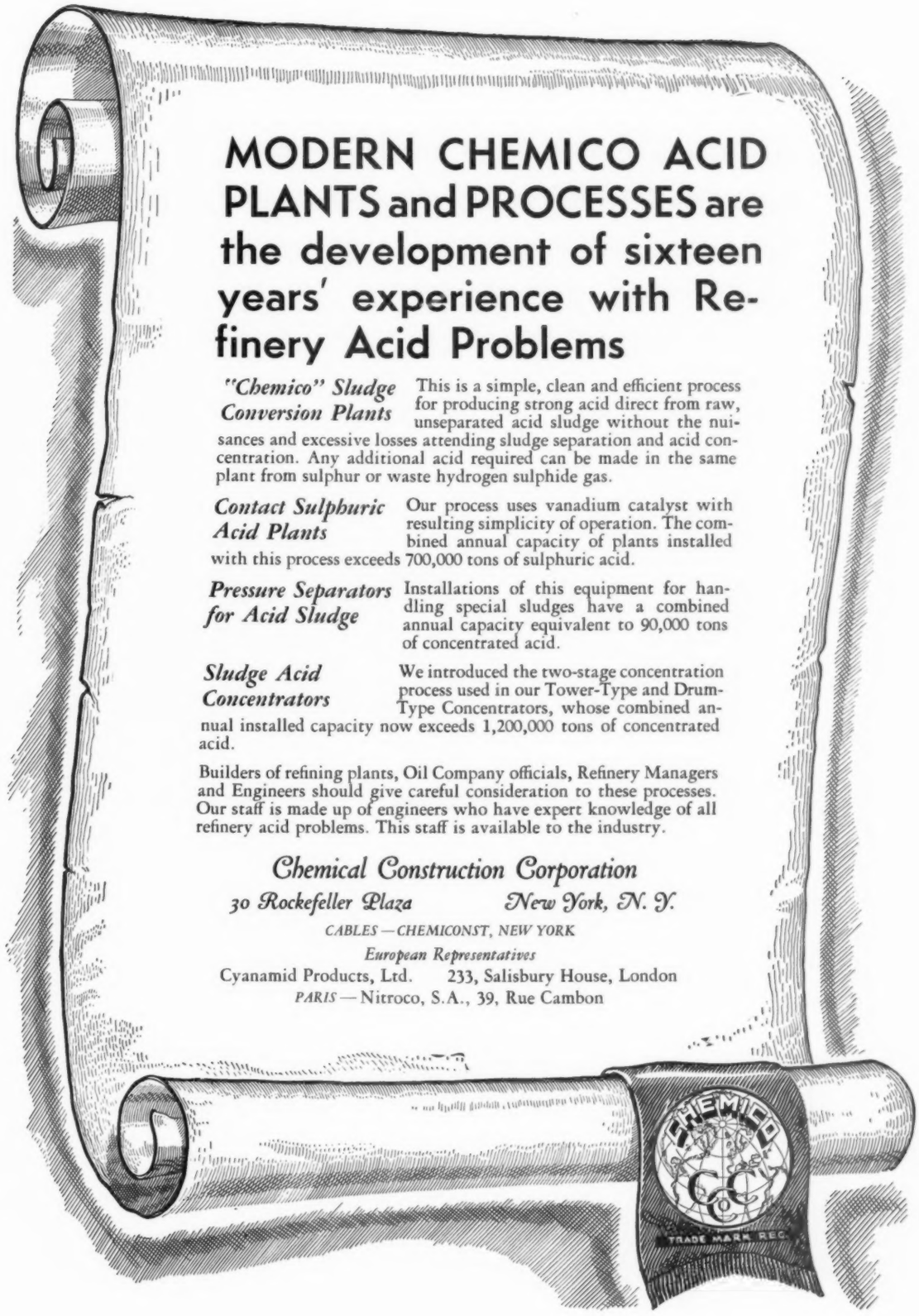

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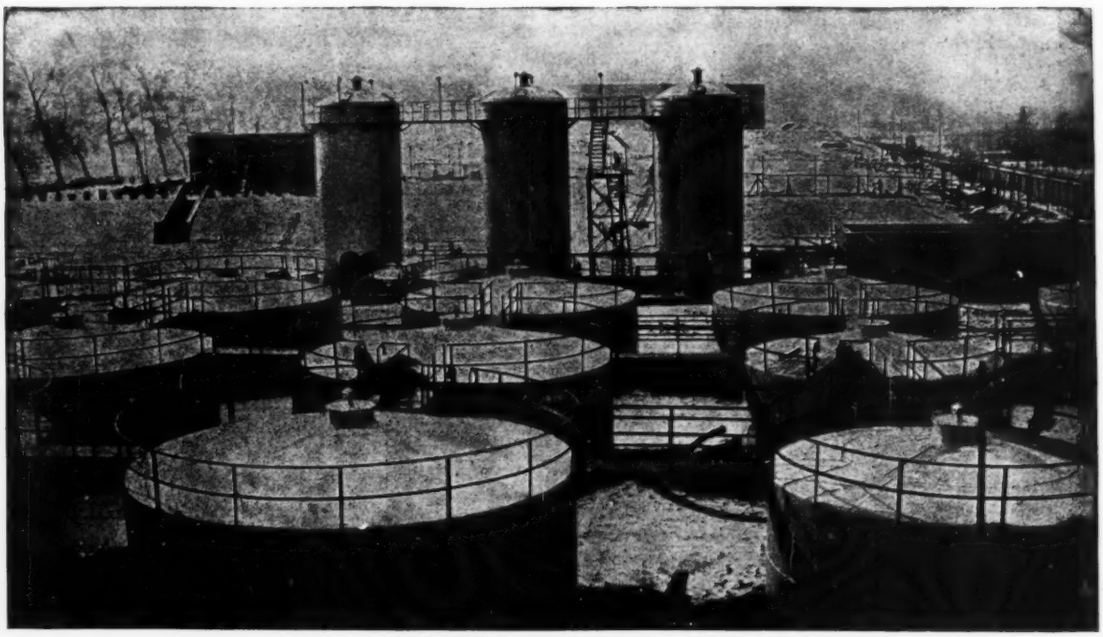

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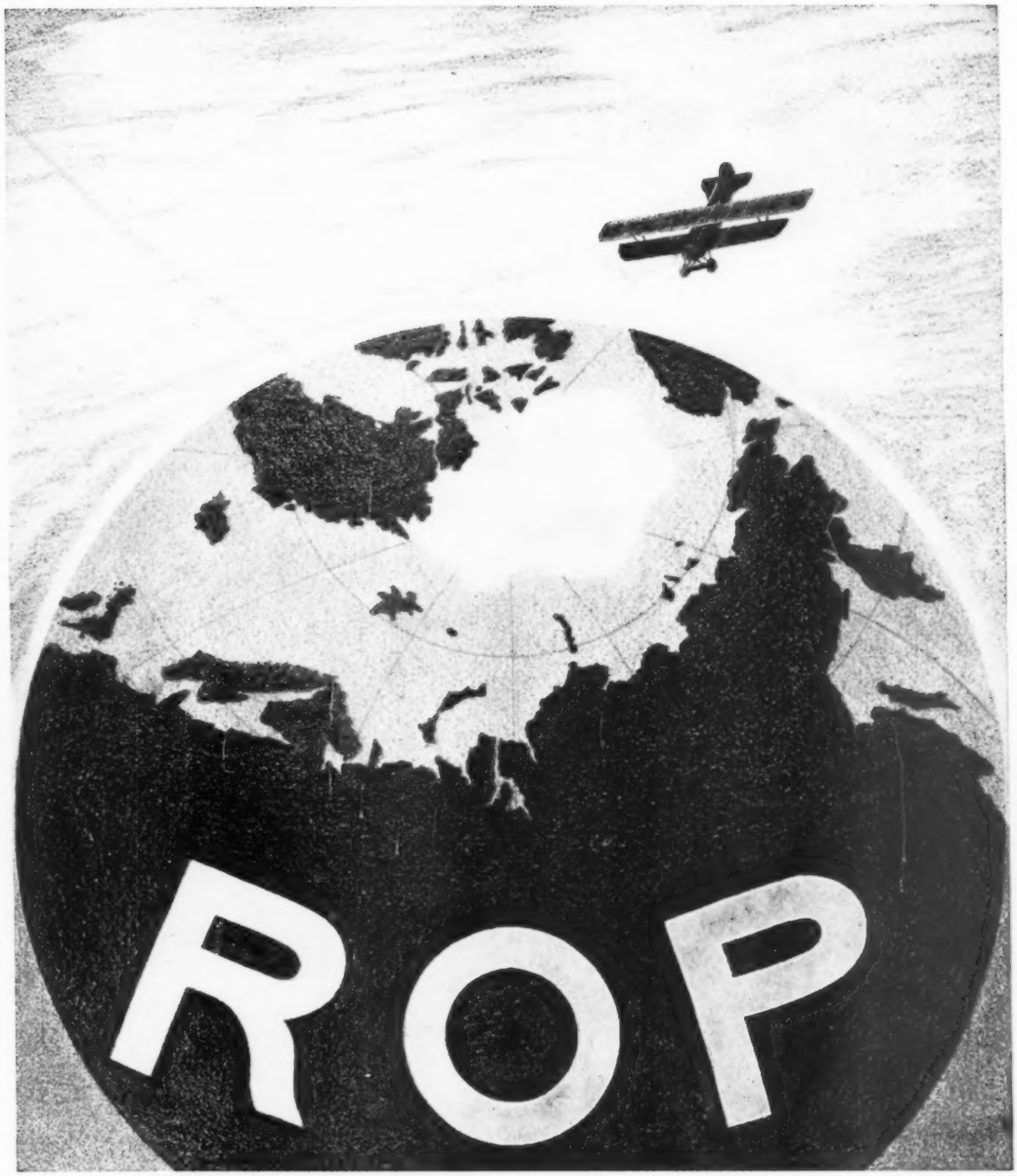

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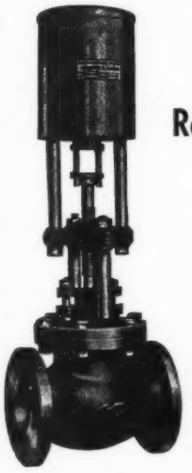

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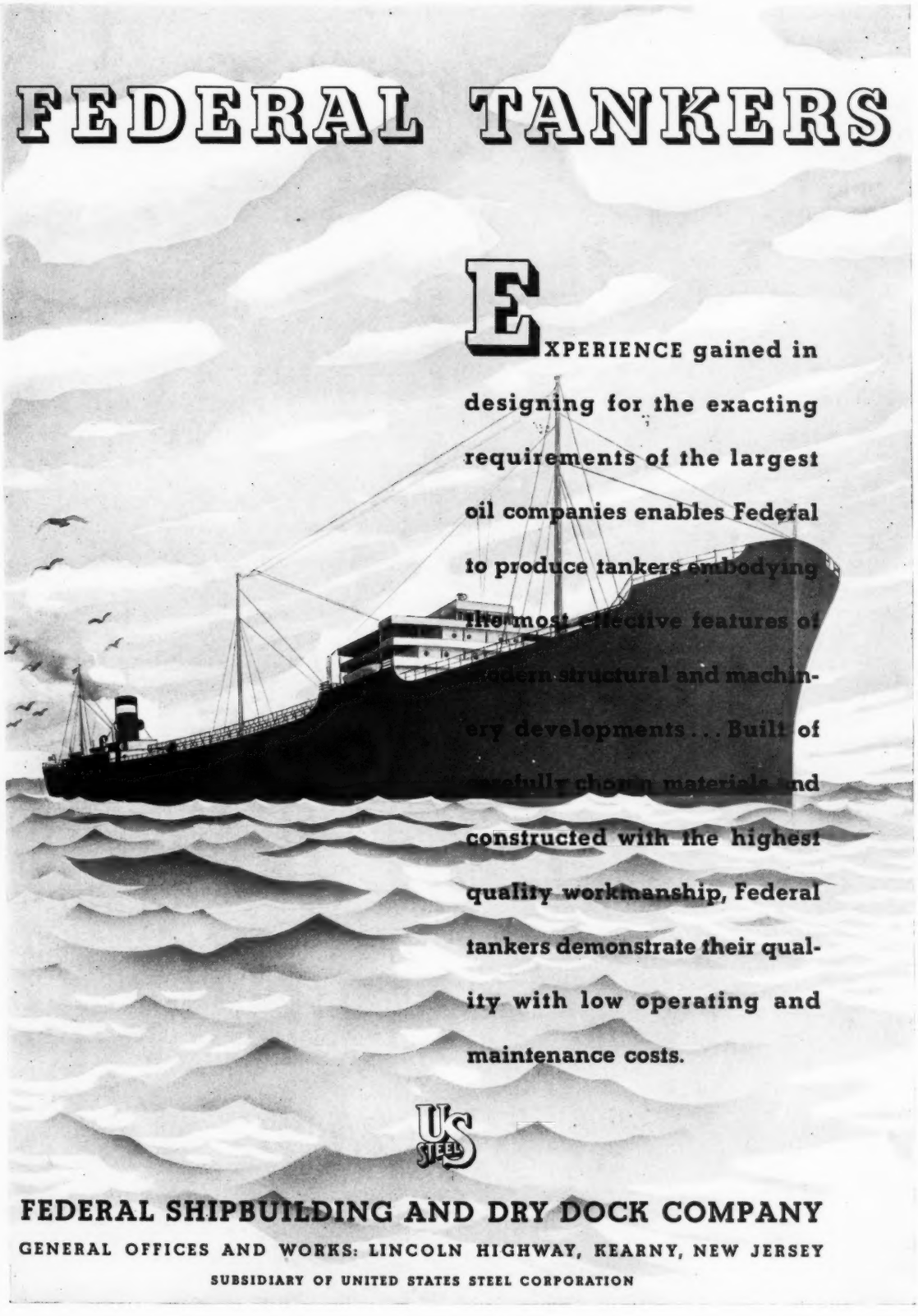

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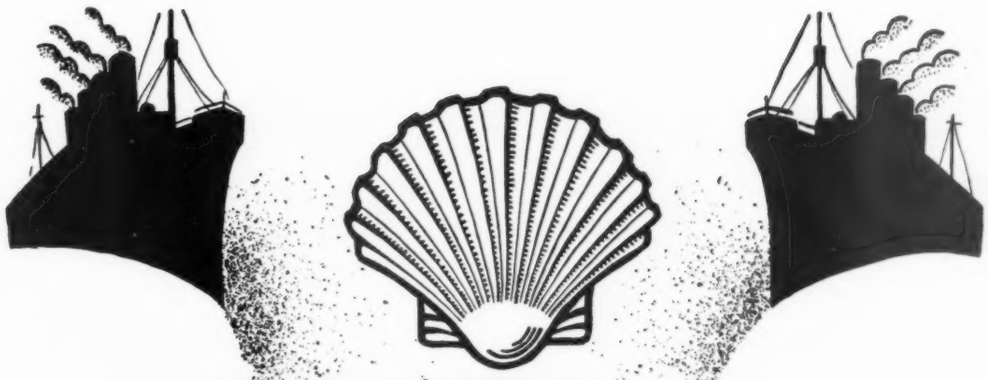

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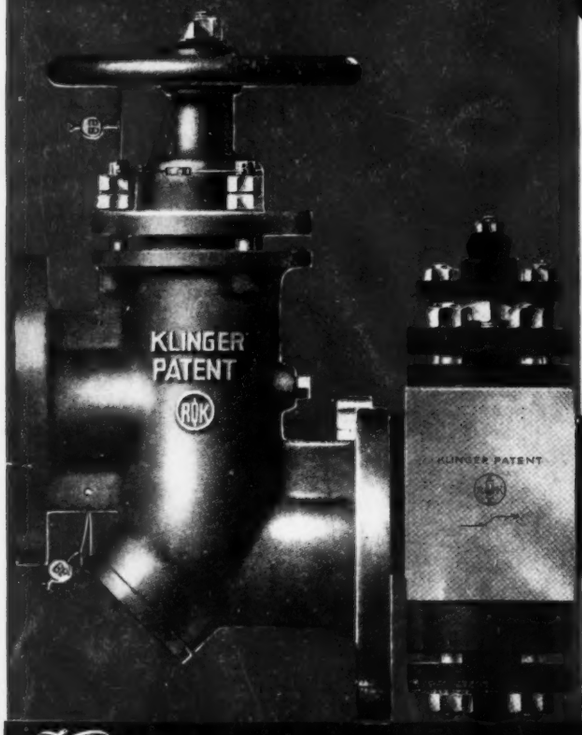

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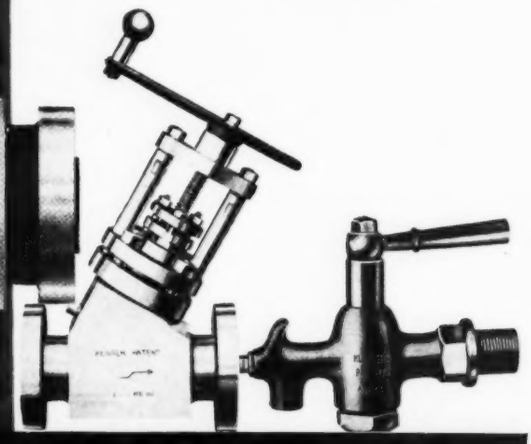

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